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MANAGING COMMITTEE.

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ERRATA.

- Vol. 25. No. 1. p. 52. Fletcher & Field (Tsutsugamushi Disease in F.M.S.) line 4 of Abstract, *for* 1925, *read* 1915.
 pp. 83, 84, 87, 90, 91 *for* "field-vole" *read* "shrew."
 p. 577. *For* 0.06 gm., *read* 0.06 mgm. (dose of adrenalin used to induce malarial relapse in birds).
 p. 885. Underhill & Mendel's reference should read *Amer. Jl. Physiol.* 1928, vol. 83, No. 3, pp. 589-633.

TROPICAL DISEASES BULLETIN

Vol. 25.]

1928.

[No. 1

YAWS AND SYPHILIS.

CORDES (Wilhelm). **Syphilis and Framboesia among Haitian Laborers in Cuba, with Ten Illustrations.**—*Fifteenth Ann. Rep. Med. Dept. United Fruit Company, Boston, Mass.* 1926. pp. 156-164. With 10 text figs. [12 refs.]

Yaws, until last year, was unrecognized in Cuba in contrast with Haiti, where 100 per cent. of the rural population is affected, while in the towns syphilis is considered to be common. In 1926 all immigrant Haitians admitted to the Preston Hospital, Cuba, were specially examined. Of 156 (mostly men about 18 years of age) 114 or 73.1 per cent. showed more or less definite signs of yaws or syphilis. 79 gave a history of yaws in childhood of whom 65 still showed the scar of the primary lesion—48 on foot or ankle, 9 on leg, 4 on hand, 1 each scrotum, axilla, lip, forehead. All with positive histories save eight gave a positive Meinicke Test. Only 2 gave a history of syphilis. Clinical symptoms are recorded irrespective of which of the two diseases are concerned and therefore possess little value; the following may, however, be mentioned. Keratosis of palms and soles with depigmentation was seen; lesions of mucous membranes were rare; 1 case each of "specific angina" and perforated nasal septum, 1 saddle-nose and 2 destructive ulceration of the soft palate, but no case of gangosa, as such persons would not be allowed to emigrate. Three cases of juxta-articular nodules were observed and one patient showed a periosteal swelling on both sides of the nose resembling goundou, which is rarely encountered in Haiti.

H. S. Stannus.

BUTLER (C. S.) & PETERSON (E.). **Treponematosis as seen in the Rural Population of Haiti.**—*Jl. Lab. & Clin. Med.* 1927 Apr. Vol. 12. No. 7. pp. 670-678. With 1 map. [9 refs.]

The authors are among those who believe yaws and syphilis are one and the same disease, and use the term treponematosis as including both; they insist that the question "deserves to be looked at with historical perspective." They then mention some of the points of resemblance—morphological identity of *T. pertenue* and *T. pallidum*; parallel serum reactions: "the clinical course of yaws is identical with that of syphilis": "the specifics are the same in the two diseases". "the histo-pathology is identical in the two conditions." Reference is then made to papers published by one of the authors answering

"most of the minor objections brought up by the dualists," and some general remarks follow adducing evidence in favour or against the opinions and explanations of experimental work done by others, together with a discussion of the results obtained by sending out a questionnaire to naval medical officers in three districts in Haiti. [This paper will help to keep this interesting question under discussion, but it will do nothing to convert holders of one opinion to the other and they will not agree upon preliminaries such as some of the points of resemblance given above.]

H. S. S.

RAMSAY (G. C.). **The Origin of Yaws in Assam.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1927. Apr. 27. Vol. 20. No. 8. pp. 506-511. [8 refs.]

Dr. Ramsay's investigations go to show that yaws among the coolies in the Assam tea gardens is contracted from the local hill tribes and that from this source POWELL'S original case doubtless gained her infection and not from Ceylon. Ramsay has found the disease prevalent among the Kukis, Lushais and Nagas. These hill tribes state that yaws was prevalent among their ancestors. He thinks the disease was imported via Burma by invading tribes and that the Manipuri were subsequently infected; it then spread to the Bengali settlers and tea garden coolies. The Manipuri distinguishes yaws from syphilis. A digression into the affinities of the Kuki and Naga tribes with suggestions of their ancient origins is of great interest and Ramsay is led to believe that it is with the negroid stock that yaws is linked, that yaws, an African disease, spread eastwards with the diffusion of negro blood.

H. S. S.

DA COSTA (Peregrino). **Yaws in Timor.**—*Far Eastern Assoc. Trop. Med. Trans. Sixth Biennial Congress, Tokyo, 1925.* Vol. 2. pp. 183-195. With 6 figs. on 1 plate.

Written in English the phraseology is rather difficult to interpret. Yaws appears to account for a third of the sickness among these islanders, more especially as secondary infections seem to be widespread. All the manifestations commonly met with in yaws elsewhere are mentioned. The author, however, goes further and attributes a form of myocarditis with sudden death to framboesia.

H. S. S.

TAKASUGI (S). **Yaws in the Caroline and Marianne Islands.**—*Far Eastern Assoc. Trop. Med. Trans. Sixth Biennial Congress, Tokyo, 1925.* Vol. 2. pp. 179-181.

Yaws is stated to be widespread in these islands. Examining 71 cases of the disease histologically Dr. YATAKA ITEGAMI of Saipan found the following changes—In primary lesions: lymphocytic infiltration of the papillary, subpapillary and superficial cutaneous layers, accompanied by some plasma cells and fibroblasts, with irregular proliferation of the rete. The treponema is found in the epithelial layers and infiltrated zones, disseminated irregularly and in the lumina of minute blood vessels. In secondary eruptions oedema, mononuclear infiltration,

dilatation and new growth of blood vessels are described. Plasma cell proliferation occurs followed by histiocytes and fibroblasts. Proliferation of rete cells with irregular branching is said to be peculiar to framboesia. Superficial necrosis, leucocytic infiltration and abscess formation are seen. Tertiary changes were studied in the bone of a leg amputated on account of "spontaneous fracture of the tibia presumably due to yaws." The histological changes in bone and periosteum were analogous to those seen in syphilitic disease—"granulomatous inflammation leading to gummatous degeneration." Proliferation of epithelioid cells and giant cell formation were never seen.

H. S. S.

HASEGAWA (Munenori). Framboesia tropica auf der Insel Formosa und deren experimentelle Versuche an Affen. [**Yaws on Formosa. Experiments on Monkeys.**].—*Japan Jl. Dermat. & Urol.* 1927. June. Vol. 27. No. 6. German summary pp. 37-38. [12 refs.] [In Japanese pp. 469-488. With 10 text figs. 37 refs.] [*Dermato-Urol. Clinic, Imperial Univ., Tokyo.*]

Yaws, which is never observed in the islands of Japan, was first seen in Formosa in 1899. About the diagnosis of the three cases coming to the polyclinic between that date and 1902 there had been some doubt in the minds of many, but in 1912 WAKASUGI noted an undoubted case in a 2 year old native child in S. Formosa, and it was established that yaws was endemic in the eastern half of southern Formosa.

In 1926 the author while investigating skin diseases among natives found many cases of yaws in the mountainous area to the south at an altitude of 1,500-3,000 feet but none in the lower lying areas. Some 80 cases were seen including 3 cases of gangosa; the disease is clinically identical with yaws elsewhere. The Wassermann and allied reactions were positive in all cases. Histological examinations of secondary lesions showed a chronic exudative inflammation, epithelial proliferation, plasma cell infiltration with round cell and leucocytic perivascular infiltration. A female monkey inoculated on the external genitalia developed a sore on the twenty-second day (with positive W.R.) which retrogressed fifty days later. When killed after eleven months findings were negative

H. S. S.

BROCHARD (V.). Essai de suppression du "Pian" et des impotences fonctionnelles d'origine syphilitique dans les collectivités indigènes. [**The Suppression of Yaws and Syphilitic Disabilities in Native Communities.**].—*Bull. Soc. Path. Exot.* 1927. Mar. 9. Vol. 20. No. 3 pp. 209-213.

The author with 26 years' service in twelve French colonies believes that syphilis and yaws, leaving out for the moment sleeping sickness, are the two commonest diseases among native populations and refers to the high invalidity rate due to yaws and to the ravages of tertiary syphilis, any but tertiary disease being rarely seen. Believing that a single dose of acetylarsan, 6-7 cc., will cure the majority of cases of yaws, he advocates a regular campaign to treat all cases along those lines. There is nothing new in this paper, but one allusion is worthy of

note. He states that when he approached, during his district journeys, the border of the British colony of Sierra Leone whole villages led by their chiefs used to come across the frontier for treatment.

H. S. S.

LICHTENSTEIN (A.). **Rhinatrophia mutilans**.—*Geneesk. Tijdschr. v. Nederl.-Indië*. 1926. Vol. 66. No. 5. pp. 680-683. With 3 figs. on 1 plate.

The name Rhinopharyngitis mutilans is commonly applied to an ulcerative process with destruction of varying anatomical parts, in the advanced stage of which the nasal and pharyngeal cavities together with the mouth form a single irregularly shaped space, but the upper lip and the tongue are never affected. The disease is insidious in onset and is generally believed to be a manifestation of yaws. The author describes a case resembling in the final stage one of Rhinopharyngitis mutilans but during the course of the disease ulceration was absent. For such cases, apparently not so rare, he suggests the name 'Rhinatrophia mutilans.'

W. J. Bais.

LE BOURHIS. Une observation de Noma consécutif à des lésions pianiques des lèvres. [**Noma Consecutive on Framboesial Lesions of the Lips.**]-*Ann. de Méd. et de Pharm. Colon.* 1927. Jan.-Féb.-Mar. Vol. 25. No. 1. pp. 127-129.

A report on the case of a native child, two years of age, seen at Lomé (Togo) who, following the appearance one month before of a primary yaw in the pectoral region and secondary lesions eight days later on the forehead, chest, buttocks and right labial commissure, presented when seen a gangrenous ulceration involving the right cheek and adjacent parts of the lips with exposure of bone and necrosis; no fever. Treatment by neosalvarsan subcutaneously and local application of "pommade au néo" failed to effect improvement, the child dying five days later. Diagnosis: yaws and framboesial noma. [It is not quite clear what this diagnosis is intended to convey; as it stands, it would appear to suggest that the noma was framboesial in origin, whereas there is probably little doubt that the gangrenous ulceration was due to a secondary infection.]

H. S. S.

SHARP (N. A. Dyce). **Yaws—its Treatment as an Economic Problem in Africa**.—*Jl. Trop. Med. & Hyg.* 1927. Jan. 15, Vol. 30. No. 2. pp. 21-22.

On account of ease of administration for mass treatment and comparatively low cost, Dr. Sharp is a strong advocate of stovarsol in the treatment of yaws. Its use he considers safe and efficacious but he gives no figures or statistical results, and incidentally states that "experiments in East Africa carried out on a large scale and described by Dr. GILKS seem to show that bismuth has not justified its use in mass treatment" but gives no reference. He also states "In those large endemic areas where yaws most probably causes considerable mortality . . .", without producing evidence that any mortality from yaws occurs.

H. S. S.

VAN NITSEN (R.). Le stovarsol chez les enfants atteints de pian. [**Stovarsol in Yaws in Children.**].—*Rev. Méd. et Hyg. Trop.* 1927. May-June. Vol. 19. No. 3. pp. 87-89. [6 refs.]

After reviewing the varying dosage in which stovarsol has been used in the treatment of yaws in children by different workers in the tropics, the author comes to the conclusion that the amount necessary to effect cure varies with each case and does not depend either on age or weight of the patient, but chiefly on the time lesions have existed. He favours the method of VAN DEN BRANDEN who gives half to one gram daily until the total in grams equals the weight of the child in kilos.

H. S. S.

VAN NITSEN. L'action du stovarsol sodique dans le pian. [**Action of Stovarsol Sodium in Yaws.**].—*Rev. Méd. et Hyg. Trop.* 1927. Sept.-Oct. Vol. 19. No. 5. pp. 146-148.

The author reports favourably on the use of stovarsol-sodium in the treatment of yaws, given intravenously, at 48 hour intervals, in 0.5, 1.0 and 1.5 gram doses for first, second, third and subsequent injections up to a total of 9.0 grams for secondary cases and 10-15 grams for tertiary cases.

H. S. S.

SELWYN-CLARKE (P. S.). **On the Exhibition of Stovarsol (Acetyloxyamino-phenylarsinic Acid) in the Treatment of Framboesia in the Ashanti.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1927. Jan. Vol. 20. Nos. 5 & 6 pp. 373-375.

Reports good results in a small series of 21 cases in various stages.

H. S. S.

PARSONS (R. P.). **Bismuto-Yatren A and B in the Treatment of Yaws.**—*U.S. Nav. Med. Bull.* 1927. Jan. Vol. 25. No. 1. pp. 117-122.

The author reports the results obtained in treating 2 series each of 20 cases with the two compounds above mentioned. It is a little difficult, however, to follow his clinical allusions. "Except for two cases of secondary lesions" (face and body covered with secondaries: secondaries on face) "and four of primary lesions" (three on lip: "primary, either side of neck") "all of the cases had ulcers" and these in all but 3 cases were situated on the leg or foot, but no mention is made of their nature. They were apparently chosen so that the rate of healing could be estimated. The A compound is an aqueous solution of the sodium salt of bismuthyl-iodo-oxyquinolin-sulphonic-acid containing an equivalent of 10 mgm. metallic bismuth per 1 cc. The B compound differs only in being a quinine combination in oily suspension containing the equivalent of 36 mgm. of metal per cc. A is used intravenously or intramuscularly, B intramuscularly only. Results are stated to have been highly satisfactory. 1-2 cc. B and 2-3 cc. A as a dose at weekly intervals was the usual method adopted and a total of 2-17 injections given.

H. S. S.

PARSONS (Robert P.). **Treatment of Treponematous Ulcers with Bismuto-Yatren.**—*Amer. Jl. Syph.* 1927. July. Vol. 11. No. 3. pp. 425-431. [Haitian Gen. Hosp., Port au Prince, Haiti.]

Having had to give up the use of arsenicals for economic reasons and having found that sodium potassium bismutho-tartrate, which was next tried, was unsatisfactory in the treatment of ulcers of undifferentiated yaws and syphilitic origin, the author then studied a series of a hundred cases to whom bismutho-yatren was administered. The manufacturers recommend simultaneous administration of doses of "A" and "B" at 2-7 days interval. Such dosage, however, the authors found badly tolerated by their patients in Haiti, but with smaller doses at longer intervals "regarding therapeutic results it can be said without reservation that these were highly satisfactory." Healing took place in 2-17 weeks generally, according to the size of the ulcers, which measured up to 80 square inches. In a few resistant cases healing was rapidly effected by arsenicals and conversely some cases which had not done well with arsenicals responded to bismutho-yatren.

H. S. S.

BEDIER (E.) & VAN DAM TRINH. Au sujet du traitement du pian par le salicylate de bismuth en émulsion huileuse gâicoolée **Treatment of Yaws by Salicylate of Bismuth in Oily Emulsion with Guaiacol.** *Bull. Soc. Path. Exot.* 1927 Jan. 12 Vol. 20. No. 1 pp. 6-10 [3 refs.]

This communication reports upon the satisfactory results obtained in the treatment of yaws in Laos by the method advocated by LENOIR: two or three hypodermic injections at intervals of 3-4 days of a solution having the formula: Guaiacol 10 gm., bismuth salicylate 100 gm., olive oil to 1,000 cc.

H. S. S.

SCHOBL (Otto). **Some Factors in Treponematous Infection that influence the Result of the Wassermann Reaction. An Experimental Study.**—*Jl. Philippine Islands Med. Assoc.* 1927. Apr. Vol. 7. No. 4. pp. 122-125. [1 ref.]

This short paper gives the conclusions of the author in regard to the correlation of the strength of the W.R. with the clinical manifestations of experimental yaws in monkeys, without details or figures. Four factors were taken into account in this work: (1) The duration of the active infection; (2) the number of inoculations; (3) the number of takes; (4) the form of yaws lesion. A period of about two months elapsed between the actual inoculation and the beginning of the positive W.R. In monkeys inoculated for the first time, in whom only local yaws developed, the W.R. was of slight degree and became negative soon after spontaneous healing. In a simple initial local yaw the W.R. lasts not more than a month. If, however, the active infection be maintained by superinfection for over four months a strong W.R. is obtained. Its strength is directly dependent on the duration of the active infection. After the yaws infection has existed for seven months, the animals will no longer respond to reinfection, but the inoculation of material containing *T. pertenue* will produce a rise in the W.R. even though it has previous to the reinoculation become negative, due to specific treatment. The W.R. is proportional directly

to the number of takes and to the degree of generalization of metastatic yaws; also an intensive lesion accompanied by swelling and oozing and an enormous number of spirochaetes will produce a stronger W.R. than a feeble dry yaw with few organisms in it. Animals which developed extensive lesions were more completely immune and become so more rapidly than do animals with few lesions.

H. S. S.

HUNTSINGER (F. O.). **Experiments with Yaws Sera and the Kahn Precipitation Test.**—*U.S. Nav. Med. Bull.* 1927. Jan. Vol. 25. No. 1. pp. 135-136.

Fifty-five cases with an age range from 2½ to 61 years, half being males and half females, all with a history of yaws or manifestations of that disease, were submitted to the Kahn precipitation test. Judging from the results in this small series of cases this test offers no advantage in the differentiation between yaws and syphilis.

H. S. S.

IKEGAMI (Y.). [**Frambesia "Reinfection": Immunologic Study.**]—*Acta Dermat.* Kyoto, Japan. 1927. Mar. Vol. 9. p. 269. [Summarized in *Jl. Amer. Med. Assoc.* 1927. July 16. Vol. 89. No. 3. p. 251.

"A comparative study of the experiments with frambesia and with experimental syphilis, Ikegami says, shows that there is a difference in the mode of immunity in the two diseases. The reinfection comes out positive in syphilis only in the earliest stage of the infection, and becomes negative 100 days after infection. In frambesia, however, the reinfection comes out positive even 617 days after infection. The features presented in the two lesions in the reinfection are also different. In syphilis, the lesion due to reinfection is not in any way different from that of the first infection, although at times prolongation of the incubation period is encountered. In frambesia, the reinfection chancre is evidently milder, the incubation period being rather longer. The so-called true immunity is obtainable in the case of syphilis within from two to three months, while in frambesia the time required to produce true immunity is greatly prolonged, i.e., at least not less than twenty months."

H. S. S.

JAHNEL (Franz) & LANGE (Johannes). Ein weiterer Beitrag zur Frage der Immunitätsbeziehungen zwischen Framboesie und Syphilis: Eine gelungene Uebertragung von Framboesie aus Sumatra auf einen Fall von progressiver Paralyse. Vorläufige Mitteilung. [**Successful Transmission of Yaws to a Case of G.P.I.**]—*Muench. Med. Woch.* 1927. Sept. 2. Vol. 74. No. 35. pp. 1487-1488. [Municipal Hosp., München-Schwabing.]

When these authors on a previous occasion [this *Bulletin* Vol. 24, p. 305], published their results on inoculation of cases of general paralysis of the insane with strains of *Sp. pertenuis* obtained from Central America they had not lost sight of the fact that different strains might give different results. In the present communication they relate their experience in inoculating a typical case of G.P.I. aged 41 years with a strain obtained from Sumatra carried in a rabbit. One month after inoculation by the scarification method the earliest signs appeared, followed in two weeks by the formation of granuloma with scaly crust,

containing spirochaetes, thus leaving no doubt as to the positive result. The G.P.I. patient had four weeks before undergone a treatment by malaria inoculation. Further observations will be published later.

H. S. S.

STEINER (L.). Quelques mots à propos de l'article de MM. E. JEANSELME et O. ELIASCHEFF: contribution à l'étude de la structure des nodosités juxta-articulaires. [**J.A.N. Priority of Description.**]—*Schweiz. Med. Woch.* 1927. Apr. 23. Vol. 57. No. 17. pp. 395-396. With 1 text fig.

JEANSELME (E.). Réponse à la note de M. STEINER.—*Ibid.* pp. 396-397.

In these short notes Steiner claims to have described the condition known under the term juxta-articular nodules prior to JEANSELME, and Jeanselme contests the claim.

The name, juxta-articular nodules, also comes in for discussion. It is true they occur elsewhere than in the neighbourhood of joints, as the photograph by Dr. STEINER well demonstrates, but it is a convenient name now in common usage.

H. S. S.

PATANÈ (Carmelo). Seconda osservazione in Cirenaica di nodosità juxta-articolari in soggetto luetico. [**Second Case of J.A.N. in a Syphilitic in Cirenaica.**]—*Arch. Ital. Sci. Med. Colon.*, Tripoli 1927. Jan. Vol. 8. No. 1. pp. 20-25. With 1 text fig. [4 refs.]

After mentioning the rapidly increasing numbers of cases of this affection put on record by French observers in Algeria and Morocco and the first cases reported from Tripolitania (ONORATA, 1924) and Tunisia (JAMIN, 1925), the author refers to the first case discovered in Cirenaica (by himself 1925) and then goes on to describe a second case: a native woman aged 38 years, denying syphilis; in the left scapular region there was, however, a typical tuberculo-ulcerative syphilide which had existed for 8 years and the W.R. was positive. There were no other lesions save the nodules which occurred as a freely moveable rounded body lying in the subcutaneous tissue over each olecranon process. They were typical of the condition as usually described and had been first noticed five years before.

H. S. S.

AKOVBIAN (A. A.). K voprossoo "Nodosités juxta-articulaires Lutz-Jeanselme." [**Juxta-Articular Nodosities Lutz-Jeanselme.**]—*Pensée Méd. d'Usbekistane.* Tashkent. 1927. No. 8. pp. 30-37. With 1 text fig. [21 refs.]

The author gives an account of the literature on the subject and of different views concerning the etiology of this disease. He agrees with the opinion of others (especially JEANSELME in his latest publications) that these nodosities should be regarded as peculiar manifestations of late syphilis or yaws only.

He describes the cases of two adult females, with strongly positive Wassermann reactions, showing periarticular nodosities near the elbows. These patients had never left Central Asia and are the first



Illustrating Dr. Steiner's contention that juxta-articular nodules occur elsewhere than in the neighbourhood of joints.

[Reproduced from the *Schweizerische Medizinische Wochenschrift*]

to be described in that region. Sections of the nodes show a structure similar to a syphilitic granuloma (especially the vascular changes), but there was a strong predominance of the connective tissue. In sections stained after Levaditi's method no spirochaetes could be detected. In the second case the nodosities disappeared after a course of anti-syphilitic treatment.

The author arrives at the conclusion that in Central Asia, where yaws is unknown, the periarticular nodosities must be regarded a sign of late syphilis only. The result of antisiphilitic treatment is satisfactory.

H. Lwow.

DA FONSECA (O.). Um typo particular de nodosidades juxta-articulares. [**A Peculiar Type of Juxta-Articular Nodules.**] -- *Bol. Inst. Brasileiros de Sci.* Rio de Janeiro. 1927. Apr. 24. Vol. 2. No. 12. pp. 365-366.

The author records the case of a man, aged 43 years, living in Batatal, Rio de Janeiro, who showed small confluent nodules of the hip, knee, ankle, elbow and wrist, of an average diameter of 0.5-1 cm., the skin over them being smooth, shining, and of a pink colour. There were 15-20 at each joint. They first began to appear a year previously and were increasing in number. There was a history of syphilis acquired some 20 years earlier. The nodules were quite painless, but it is stated that the patient complained of "rheumatism in the limbs."

H. Harold Scott.

PALASKA (R.). [Les nodosités juxta-articulaires en Afrique du Nord (contribution à leur étude étiologique)] [**Juxta-Articular Nodules in North Africa.**] -- *Thèse Fac. Méd. Alger.* 1926. [Summarized in *Bull. Inst. Pasteur.* 1927. Mar. 15. Vol. 25. No. 5. p. 212.]

The author in his thesis considers that J.A.N. are a definite entity—the result of infection with the treponema of syphilis or yaws—in Algeria of syphilis only, as yaws does not there exist.

H. S. S.

BERNARD (Raoul). Les nodosités des saillies osseuses. [**Nodosities of the Bony Prominences.**] -- *Bruxelles-Méd.* 1927. June 26. Vol. 7. No. 35. pp. 1083-1086. [33 refs.]

A general survey of the subject for the information of medical practitioners who may not be familiar with the condition.

H. S. S.

CHESTERMAN (C. C.). **The Relation of Yaws and Goundou.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1927. Apr. 27. Vol. 20. No. 8. p. 554.

Reports a case of goundou in a girl aged 12. The paranasal swellings had been noted for two years, and were associated with a proliferating periostitis of the mandible and sabre tibiae and a history of yaws four years before. This is the first case of goundou seen at the B.M.S. Hospital Yakusu, Congo Belge, in six years where four to five hundred cases of tertiary yaws are treated annually.

H. S. S.

MACGREGOR (I. Gregor). **An Investigation of Fifty Cases of Ganglion in Lagos.**—*West African Med. Jl.* Lagos. 1927. July. Vol. 1. No. 1. p. 6. [1 ref.]

The author reports fifty cases of ganglion about the wrist with positive Sachs-Georgi reactions treated by N. A. B., .6 gm. weekly with total of 2.4 gm. In a number of cases the ganglia were multiple, in two the foot was also affected. In two cases juxta-articular nodules were also associated. No signs of yaws were present [history of yaws in the past not mentioned] but the author considers the affection to be a manifestation of that disease.

H. S. S.

WEBB (W. Leslie) & HOLLIDAY (Margaret). **Signs and Symptoms in Late Syphilis in Buganda.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1927. July 11. Vol. 21. No. 1. pp. 39-48.

In this communication the authors attempt to formulate conclusions in regard to the types of lesion due to late syphilis found among the Baganda. The figures given were obtained by analysing the data recorded in a card index of patients attending the Mulago Hospital for venereal diseases during the past five years. All doubtful cases and those without a positive W.R. were rejected, the diagnosis being made by a medical officer or in some cases among women by a nurse. The authors are aware of some of the fallacies which may be met with when dealing with natives but the statement is made that there is no doubt all the cases analysed—4,000 men and 3,711 women—were cases of syphilis, one reason for this statement being that "the infection rate of yaws is low and confusion between the late signs and symptoms of the two diseases is avoided in any degree likely to influence results." [With their knowledge of local conditions this statement may be correct, but the proof does not appear to be self-evident in the text.]

It would be impossible to deal in detail with the mass of statistics presented, but some of the figures given may be mentioned: "Simple ulcer forms the commonest single sign of late syphilis . . . they are often indistinguishable from non-specific ulcerations." There were 1,800 cases of simple ulcer unassociated and 510 cases associated with other manifestations of syphilis [It is not quite clear what is meant by simple ulcer, as either they were gummatous ulcers, in which case they should not be designated "simple," or if truly "simple" they were not syphilitic.] These so-called simple ulcers are said to be "commonly associated with gummata and destructive processes," a statement not borne out by the table given, the *most* common associations being with bone pain 170, with gummata 73, with destructive processes [presumably also gummatous] 48.

Pains in the limbs and joints, worse at night, are described in 1,488 cases unassociated and in 622 associated with other signs. This symptom is stated to be "commonly associated with dermatitis, pain in the chest, and syphilis of the circulatory system, but rarely seen with destructive processes." [From the table the *most* commonly associated lesion would appear to be the simple ulcer above mentioned.] The pain in the chest is not further defined than to suggest that it is due to mediastinitis. Headache was also common.

"Gummata" were found unassociated in 238 cases, associated with other lesions in 149; a condition called *nungu*, hyperkeratosis of the feet and less often of the hands with fissuring and a variable degree

of ulceration in 318 cases alone and associated with other signs in 236. The associated sign is commonly (130 of 318 cases) a scaly rash of the palms and occasionally of the dorsum of the feet called *bikata*. Leucoderma of the hands and less often of the feet is perhaps the commonest sign of all in late syphilis, but has not always been recorded. [One is struck while reading this paper, by the fact that very similar observations have been recorded by other authors dealing with yaws. Are the observers in Uganda dealing only with syphilis? Are the observers in other areas only dealing with yaws? Where does the truth lie? This paper has a special value in showing how urgent is the problem of settling the relationship of yaws to syphilis.] Visceral syphilis was uncommon and almost entirely restricted to men. cirrhosis of liver 26 to 1, M. to F.; jaundice 2 to 0; ascites 10 to 2; splenitis 40 to 0; nephritis 4 to 0; anasarca 0 to 1; oedema 19 to 0. [These are clinical diagnoses.] "The figures for stigmata are low, particularly amongst a people with so high a congenital syphilis rate." [This the authors account for as due to death of the syphilitic infant, but no facts are produced as evidence of high rate of congenital syphilis, and high death rate.] Among nearly 8,000 cases keratitis was seen in 14 men and 3 women; saddle nose 11 and 0; fissured lips 2 and 0; Hutchinson's teeth 16 and 0; sword tibia 22 and 0. Syphilis of the nervous system is divided into what is headed "*intrinsic nervous syphilis*" and a group "which includes *all syphilis showing nervous symptoms probably following on lesions of the circulatory system.*" Under the first mentioned heading, there were 66 men and 17 women: paresis 14:0, paralysis 3:0, paraplegia 9:0, Charcot's joints 6:3, optic atrophy 1:0, optic neuritis 1:0, tabes (?) 1:0, Argyll Robertson pupil 1:0, etc. [an ill classified group]. In the second group are placed headache 91:254, hemiplegia 27:9, etc.

Under syphilis of the circulatory system one or two cases each of myocarditis, endocarditis, mitral and aortic disease, atheroma, aneurysm, endarteritis, arteriosclerosis, high blood pressure are mentioned.

[It is interesting to note that no mention is made of cases of goundou, gangosa or juxta-articular nodules. Records of long series of cases such as have presented themselves for treatment in Uganda are of great value. The authors have attempted to analyse a mass of data collected presumably by others. Their results lose very greatly from the fact that the data have been badly collected; there appears to have been a lack of appreciation of the pathological processes underlying many of the lesions described so that any proper classification has been impossible. This is no unkindly criticism. Everyone is well aware of the difficulties the busy medical officer has to meet on the clerical side but the authors will do a great service if using their paper as a text they point out the method whereby such statistics should be collected.]

H. S. S

KIRSCHNER (L.). Over het voorkomen van Tabes dorsalis onder de Inlandsche (Soendaneesche) bevolking (met demonstratie van een film. [**Occurrence of Tabes Dorsalis in the Sundanese (with Demonstration of a Film).**])—*Geneesk. Tijdschr. v. Nederl.-Indië*. 1926. Vol. 66. No. 6. pp. 737-749. With 2 figs. on 1 plate. [17 refs.]

After reviewing the literature in which there is a consensus of opinion as to the rarity of this affection among Asiatics, the author records two

cases he met with among 3,800 native patients at a polyclinic and quotes a third reported by Dr. ROOS VAN DEN BERGH. There was no doubt as to the diagnosis and neither had received adequate treatment for syphilis, thus lending no support to the theory of MULDER (this *Bulletin*, Vol. 23, p. 452) who considers the modern treatment of that disease as one of causes of the greater prevalence of parasyphilitic affections seen in natives during recent years. None of the patients belonged to the civilized class but two admitted alcoholic indulgence. Kirschner joins ENGELHARD in believing that many cases escape medical observation owing to their not seeking treatment. [An opinion at variance with the fact that no cases of tabes have been recorded in the indentured Javanese labour force on the east coast of Sumatra, numbering over 200,000 individuals under strict medical control.]

W. J. Bais.

LOMBARDO (C.) & TORNABUONI (G.). Ricerche sulla recettività del lama alla sifilide. [**On the Susceptibility of the Llama to Syphilis.**]—*Pathologica*. 1926. Dec. 15. Vol. 18. No. 422. pp. 586–589. [24 refs.]

LANCELOTTI and JAUREGUI stated in 1925 that the llama suffered from a disease in all respects identical with human syphilis, and that the condition was probably acquired by man from this animal. The authors, and others, inoculated 30 llamas in various parts of the body with syphilitic material from a primary chancre containing numerous spirochaetes, without producing anything resembling syphilis, nor did the serum of the animals give a persisting positive Wassermann reaction. Further, they could not confirm the report of good results following the injection of llama serum in cases of syphilis, and, in fact, hint that the latter idea was a clever stunt to place upon the market a curative serum for the disease (un più o meno abile bluff per lanciare commercialmente un siero per la cura della sifilide).

H. Harold Scott.

BLONDIN. Destruction de la face par lésions syphilitiques. Guérison par le 914 en lavements. [**Destruction of the Face by Syphilis. Cure by 914.**]—*Bull. Soc. Path. Exot.* 1927. July 13. Vol. 20. No. 7. pp. 696–700. With 2 text figs.

Brief notes of the case of a 15 year old native in Senegal suffering from destruction of the nose, upper lip and part of the cheeks due to syphilis which healed up under treatment by a course of 914, 0.15 gm. per dose given per rectum.

The interest of this observation, says the author, does not lie so much in the good result obtained as in the method of treatment adopted—one as useful as the intravenous method but little used.

[It is interesting to compare the excellent photograph of this syphilitic case with those of cases of gangosa considered to be due to yaws and note the points of difference.]

H. S. S.

- JONES (Alfred E.). **Antimony and Potassium Tartrate in Chancroidal Infections. Results of Intravenous Treatment.**—*Jl. Amer. Med. Assoc.* 1927. May 28. Vol. 88. No. 22. pp. 1699-1700. [4 refs.]

By supplementing the local treatment of the conditions (cauterization, incision, drainage, phenol, alcohol, silver nitrate, iodine, etc.) with intravenous injections of a 1 per cent. solution of antimony potassium tartrate—3-10 cc. at four-day intervals—the duration of treatment was shortened by 50 per cent., 85 per cent., of 27 cases so treated giving excellent results.

H. S. S.

- POWER (P.). **Toxic Effects of the Arsenobenzol Compounds.**—*Jl. Roy. Army Med. Corps.* 1927. Jan. Vol. 48. No. 1. pp. 46-51.

An article dealing collectively and in short with all the lesser and more serious complications which may occur with arsenobenzol therapy together with appropriate treatment. It is in convenient form and to the point, though, of course, there is nothing new to chronicle.

H. S. S.

- HENDRIE (Helen McD.). Report from District of Yendi Northern Territories on Effect of Bismuth Tartrate in Treatment of Yaws as Noted in the District.—*Gold Coast Rep. Med. & San. Dept. for Period Apr. 1925-Mar. 1926.* Appendix D. pp. 59-60.

GRANULOMA VENEREUM.

- MANSON-BAHR (Philip) & ANDERSON (S. M.). **On Ulcerating Granuloma of the Pudenda.**—*Brit. Jl. Ven. Dis.* 1927. Jan. Vol. 3. No. 1. pp. 12-23. With 5 text figs. [11 refs.]

The authors report in some detail five cases met with in the last four years and draw attention more particularly to the very varying amounts of antimony tartrate needed to effect cure, from 17½ to 179 grains in their several cases; to the necessity for injections being given in an uninterrupted series; to the even greater efficacy of von Heyden 471; to the advantages in some cases of local applications of 1 per cent. antimony tartrate in white vaseline left on for two hours at a time alternating with boracic ointment or eusol; to the use of thyroid by mouth.

The descriptions of the cases with photographs and differential diagnosis will serve to bring to the notice of medical men a condition which may, unless they are familiar with it, cause some trouble in diagnosis. There is also an interesting description of the pathological side, the authors believing, for reasons which they give, that the causal organism has not yet been demonstrated. Reference is made to the resemblance to *ulcus molle serpiginosum*, a condition which is found in countries outside the tropics.

H. S. Stannus.

- SEQUEIRA (J. H.). **Ulcerating Granuloma.**—*Proc. Roy. Soc. Med.* 1927. Feb. Vol. 20. No. 4. pp. 346-347. (Sect. of Dermat. pp. 38-39.)

This case was shown at a clinical demonstration of the Section, but unfortunately there do not appear to have been any tropical practitioners present to discuss it.

Male, aged 36, with a history of soft sore 17 years previously, and of having been in South America in 1913. No history of syphilis and W.R. negative. A year ago had been in hospital "with ulceration on the inner side of the thigh extending to the knee." Under pot. iod. he got worse: with salvarsan there was no reaction, but $\frac{1}{2}$ gr. doses sod. antim. tart. proved successful. Three months later he returned with an acute outbreak on shoulder and back which again has responded to antimony. Histologically, Dr. INGRAM describes the earliest appearance as a granuloma, but "later nothing but bags of pus": no "Leishman Donovan" bodies. Blood culture negative while the early lesions yielded a staphylococcus and a diphtheroid bacillus non-pathogenic for animals. Dr. BARBER in discussion referred to a similar case from which a diphtheroid organism had been isolated by Dr. KNOTT which appeared to possess practically all the characters and reactions of a specific organism.

H. S. S.

GIBSON (E.). **A Case of Ulcerating Granuloma Venereum.**—*West African Med. J.* Lagos. 1927. July. Vol. 1. No. 1. p. 6.

A note of the successful treatment of a case as above described by stovarsol, 1-2 tablets by mouth daily and bismoxyl, 1 cc. subdermally once a week [the total amounts given not mentioned] after failure firstly with a full course of N.A.B. and mercurials, secondly with a full course of antimony tartrate.

H. S. S.

SARGENT (James C.). **Granuloma Inguinale. Report of a Case from Wisconsin.**—*Jl. Amer. Med. Assoc.* 1927. Apr. 30. Vol. 88. No. 18. pp. 1394-1395.

Writing from Milwaukee the author, who judges this condition to be rare in Wisconsin in spite of FRASER's assurance that it is very prevalent among the coloured races of the Cape province [this *Bulletin*, Vol. 22, p. 797], gives notes of a case in a negro male aged eighteen years. The diagnosis was made apparently on the beliefs that cancer in negroes is uncommon, cancer of the penis in a negro exceedingly rare and cancer of the penis in a negro boy less probable than G.I. The boy had, in fact, lain in hospital with "a sore" on the penis and in the right groin for two months diagnosed as epithelioma on the strength of the pathologist's reports on sections from the sores. The W.R. was + + + +, but antisypilitic treatment produced no result. After 10 intravenous injections of 10 cc. of 1 per cent. solution of antimony potassium tartrate the lesions were healed. When healing was completed smears and cultures were made; in the direct smears cell inclusions thought to resemble Donovan bodies were seen in several large mononuclear cells. A slow growth was obtained on Sabouraud's agar. The organism isolated "was a non-motile, non-spore forming, non-capsulated gram-negative bacillus with a suggestion of formation of polar bodies."

H. S. S.

SIDLICK (D. M.). **Granuloma Inguinale of the Face and Mouth.**—*Arch. Dermat. & Syph.* 1927. June. Vol. 15. No. 6. pp. 703-708. With 2 text figs. [Refs. in footnotes.]

Reports the case of a coloured man of S. Carolina admitted to the Philadelphia General Hospital with lesions on the penis, in the perineum, in the groins and on the right cheek which had appeared in that order. The lesions were characteristic and scrapings showed Donovan bodies. W.R. negative. After six months treatment with 10 cc. doses of a 1 per cent. solution of antimony potassium tartrate intravenously every second

day, the lesions had mostly healed, the face only being refractory. He then left hospital returning six months later, the lesions having relapsed; in addition lesions consisting of flat topped papules with abraded surfaces or small ulcerations, yielding Donovan bodies, had appeared on the buccal mucous membrane. A second course of treatment failed, and a third course only appeared to have any influence after local treatment by roentgen ray. The palate was treated on fourteen different occasions, the time of exposure being five minutes with 4 milliamperes and a spark gap of 14 cm. The filtration used was from 0.5 to 1 mm. of aluminium and the focal distance 50 cm. The cheek was treated four times with the same technic except that the time exposure was ten minutes and the filtration 5 mm. aluminium. The penis and groins received ten treatments as above.

H. S. S.

JOURNAL OF LABORATORY & CLINICAL MEDICINE. 1927. June. Vol. 12. No. 9. pp. 929-931. [8 refs.]—**The Etiology of Granuloma Inguinale.** [R. A. K.]

An editorial note upon a disease which recent reports indicate is endemic in various parts of North and South America and is much more prevalent in the United States than is generally supposed. Reference is made to the uncertain etiology, and to the various organisms that have been described as obtained either by direct smears or cultivation—Donovan bodies, bacteria of the group of which *B. mucosus capsulatus* is the type, and another organism described by CORNWALL and PECK which in old cultures reproduces exactly the morphology of Donovan bodies, reproduces the disease in rabbits, which in turn give positive complement fixation tests and for which the name *B. venereo-granulomatis* is proposed.

H. S. S.

MCGLINN (John A.). **The Treatment of Granuloma Inguinale with Tartar Emetic.**—*Amer. Jl. Obstet. & Gynecol.* 1926. Nov. Vol. 12. No. 5. pp. 665-672. With 7 text figs.

The author relates a series of cases of this affection in the female (with a good set of photographs) all among negroes, except two, met with at the Philadelphia General Hospital. The usual site of the initial lesion is the labium majus, but the entire vulva and groin may be involved with extension into vagina and destruction of the recto-vaginal septum. Reference is made to the mistakes in diagnosis before 1921. Donovan bodies were universally found in fresh smears in untreated cases and disappeared entirely after two or three treatments with tartar emetic; smears are but little contaminated by organisms usually present in the vulva lesions. Treatment was by means of 1/10 gm. tartar emetic dissolved in 10 cc. sterile salt solution intravenously at weekly intervals in ambulant cases or every second day in hospital cases. Severe rheumatic joint pains were a noticeable objection to this form of treatment and caused many patients to fail to persist in attendance for the series of injections found necessary to prevent relapse.

H. S. S.

HUTCHINSON (W. A.). **Granulomata treated with Intravenous Tartar Emetic. A Report of Five Cases.**—*Fifteenth Ann. Rep. Med. Dept. United Fruit Company, Boston, Mass.* 1926. pp. 131-134. [1 ref.]

Three cases of granuloma inguinale and two cases of dermal leishmaniasis treated successfully with tartar emetic are reported,

1 cc. increasing daily by 1 cc. up to 10 cc. of a 1 per cent. solution given daily. The only point of interest in the paper is the fact that healing was obtained in the first mentioned disease in two, two and four weeks respectively.

H. S. S.

THILLOT (M. Thierfelder). Blutstudien in Niederländisch-Süd-Neuguinea. [**Blood Studies in Dutch Southern New Guinea.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1927. Feb. Vol. 31. No. 2. pp. 57–63.

In southern New Guinea venereal granuloma is so widespread that the author considers all adult males and females have had the disease. This great increase has occurred since 1910 and did much to impoverish the local stock. The blood picture in this disease shows no alteration from the normal for the local inhabitants, except in cases with gross secondary infections and in cachexia. A mild lymphocytosis and slight anaemia may be due to this affection and the eosinophilia found is probably due to ascaris infection.

H. S. S.

BERRI (J. C.). Un nuevo caso de granuloma venéreo con localización vulvar, perianal, inguinal e inguinocrural. [**Another Case of Granuloma Venereum involving the Vulvar, Perianal and Inguinal Regions.**]—*Bol. Inst. Clin. Quirúrg.* Buenos Aires. 1927. Vol. 3. Nos. 21–25. pp. 715–718. With 3 text figs. [Also issued as *3a Reunión Soc. Argentina Patol. Regional del Norte, Tucumán, Julio 7, 8 y 10, 1927.* pp. 607–610 & illustrations.]

The only noteworthy feature of this case is that the Wassermann reaction was positive and the condition was at first thought to be purely syphilitic. Treatment by antisyphilitic measures, however, led to but partial improvement. Tartar emetic was then given, starting with 5 cc. of a 1 per cent. solution. At the time of reporting, nine injections of this drug (the last four being 8 cc. each) had been administered and the lesion was nearly healed.

H. Harold Scott.

PUENTE (J. J.). Granuloma venéreo. [**Granuloma Venereum.**]—*Bol. Inst. Clin. Quirúrg.* Buenos Aires. 1927. Vol. 3. Nos. 21–25. pp. 719–720. With 3 coloured figs. on 1 plate. [Also issued as *3a Reunión, Soc. Argentina Patol. Regional del Norte, Tucumán, Julio, 7, 8 y 10, 1927.* pp. 611–612 & illustrations.]

A few general remarks on the condition illustrated by three lurid and realistic coloured figures.

H. Harold Scott.

CLIMATIC BUBO.

HANSCHHELL (H. M.). **A Note on Climatic Bubo.**—*Brit. Jl. Venereal Dis.* 1927. July. Vol. 3. No. 3. pp. 244–246. With 1 text fig.

In this short note the author records several interesting observations made at the Seamen's Hospital Venereal Clinic. The immensely greater prevalence of the bubo in warmer climates accounts for the term "climatic." Among his patients Hanschell shows that the affection is three times more frequent in engineer officers who work in

very hot and very moist atmospheres than among deck officers, while among forecabin hands, stewards and firemen the proportion is 1 : 1 : 2.5.

No case of the disease has been seen in eight years among Moham-medan Indian "lascars"—climatic bubo being very rare among the circumcised in contrast to the uncircumcised white man or Indian, the Negro and Mongol. [No statistics given.] Attempts to isolate a causal organism have failed.

The characteristic histological picture of "endothelial-cell-like proliferation" rather than round-cell infiltration the author finds inconstant.

The treatment advocated consists in : (1) Rest in bed ; (2) cleansing the preputial sac with alcohol ; (3) aspiration of any collections of pus ; (4) the intravenous injection of mixed typhoid vaccine—1, 2 and 3 millions bacilli at three to four day intervals.

H. S. S.

FREI (W.) & HOFFMANN (H.). Experimentelles und Klinisches zum "Lymphogranuloma inguinale." I. Mitteilung. [**Lympho-granuloma inguinale, Experimental and Clinical.**]—*Arch. f. Dermat. u. Syph.* 1927. Apr. 23. Vol. 153. No. 1. pp. 179-199. With 2 coloured text figs. [38 refs.]

The authors have sought to show whether in this condition specific dermal reactions can be obtained. Of 32 cases of persons suffering from lymphogranuloma inguinale, including four women, using material aspirated from a gland, in 31 the result was positive. With vaccines of a pseudo-diphtheria bacillus positive reactions were commonly obtained and less often with a variety of other organisms. The antigen in the first cases was obtained by puncture of a softened but unruptured gland, diluted 5-10 times, heated for two hours on the first day and one hour on the second day at 60° C., the dose being 0.1 cc. injected into the upper arm—the reaction was best seen on the second day ; in controls the result was negative. In the second group of cases the diphtheroid organism was obtained from a bubo in similar fashion. Other organisms tested were two strains of *Staphylococcus albus*, a *S. aureus*, *B. coli*, etc., with varying results. Individual cases of lymphogranuloma inguinale gave positive reactions to many different organisms used as antigens. Attempts at animal infection by all methods of inoculation were practically negative, while bacteriological and clinical observations yielded no essentially new results. Treatment by tartar emetic, yatrien and X-rays have not given satisfactory results. In a single case spontaneous cure was observed. The paper cannot be further summarized but attention is called to two very excellent coloured photographs.

H. S. S.

BOUFFARD. La lymphogranulomatose inguinale subaiguë. [**Subacute Inguinal Lymphogranuloma.**]—*Ann. de Méd. et de Pharm. Colon.* 1926. Oct.-Nov.-Dec. 1926. Vol. 24. No. 4. pp. 563-567.

The author saw among both European and native patients in the hospital at Abidjan, Ivory Coast, in 1925, many cases of climatic bubo. His clinical description and negative bacteriological findings do not differ from those of other observers, but he lays stress on

the fever accompanying the adenitis as characteristic of the earlier stage. At the same time he states that he has never seen a primary genital lesion and does not believe in a venereal etiology. He recommends conservative treatment and does not advocate excision or incision, but drains the inflammatory mass by inserting 7 or 8 "crins de Florence," and washes out existing cavities with alcoholic solution of iodine.

H. S. S.

DELBET (Pierre). Vaccinothérapie des paradénites. [**Vaccine Therapy in Climatic Bubo.**]—*Bull. Acad. Méd.* 1927. Apr. 5. Year 91. 3rd Ser. Vol. 97. No. 14. pp. 453-457.

In 1923 the author reported upon the success attending the treatment of this affection in three cases by a method of vaccination. Now two other cases having presented themselves for treatment, he has again followed the same treatment and reports remarkable results. The method employed consists in excising a convenient portion of the mass of glands which is then cut up into small pieces, dehydrated at 37° C. for 48 hours over calcium chloride emulsified in saline and injected [subcutaneously presumably] in increasing doses on alternate days, a total of five. Complete disappearance of other gland masses was obtained in 10 days in the first case. In the second case of five months standing with fistulae present, ten injections were given between February 9th and March 4th. Sixteen days after the first injection the masses had disappeared, the fistulae were closed and the wounds healed. The author is anxious others should try this method.

H. S. S.

WHITMORE (V. H.). **Climatic Bubo.**—*U.S. Nav. Med. Bull.* 1927. Jan. Vol. 25. No. 1. pp. 89-102. [14 refs.]

After a description of the disease such as is found in any text-book the author gives notes of some eleven cases coming under his own care. The paper contains nothing new.

H. S. S.

FAVRE (M.). Quelques remarques à propos de l'article de M. Robert Clément intitulé l'étiologie du granulome vénérien, adénopathie inguinale subaigue simple à suppuration intraganglionnaire. [**A propos a Paper by Dr. Clement on Climatic Bubo.**]—*Presse Méd.* 1927. Jan. 26. Vol. 35. No. 8. pp. 117-118.

Dr. Favre deals with the article by M. CLEMENT reviewed in this *Bulletin*, Vol. 24, p. 317. He criticizes in no uncertain measure an article which confused the two clinical entities known as granuloma venereum and climatic bubo.

H. S. S.

FREI (Wilhelm). Lymphogranulomatosis inguinalis. Strumöse Bubonen, klimatische Bubonen. [**Climatic Bubo.**]—*Klin. Woch.* 1927. June 4. Vol. 6. No. 23. pp. 1097-1103. [Numerous refs.]

An encyclopaedic article on climatic bubo with authors' references for all statements made.

H. S. S.

TROPICAL MYCOLOGY.

NANNIZZI (A.). [Ricerche sui rapporti morfologici e biologici tra Gymnoascacee e Dermatomiceti.] [**On the Relationship of the Dermatophytes to the Gymnoascaceae.**—*Annales Mycologici*. 1926. Vol. 24. pp. 85–129. With 6 plates. [Summarized in *Bull. Inst. Pasteur*. 1927. Feb. 15. Vol. 25. No. 3. pp. 125–127.]

This work affords the first definite support of the theory of MATRUCHOT and DASSONVILLE as to the relationship of the Gymnoascaceae and the Dermatophytes. The author considers that the Dermatophytes, in the parasitic state or when growing in pure culture on the usual media, exhibit a kind of teratological aspect, resulting from the disturbing effects due to the nature of the medium, the irregular growth of the mycelium and the variation in form and dimensions of the various spores.

The saprophytic life of the Dermatophytes was demonstrated and studied by growing the species *Trichophyton granulosum*, *T. denticulatum*, *T. felineum*, *T. equinum*, *T. radiolatum*, *T. asteroides*, and *Microsporum lanosum*, on feathers, pelt of guineapigs, human hair, and bits of hide, kept dark and moist at ordinary temperature. *T. radiolatum* was grown on the corpse of a guineapig interred in a wooden box; and *T. asteroides*, inoculated on forest soil mixed with feathers and bones placed in a box in full light, was found in full production of aleuries and fusiform spores after six months.

T. asteroides, *T. radiolatum*, *T. denticulatum*, and *T. felineum*, were then grown in tubes on sterilized hide, feathers and hair, and were found to develop, under such conditions, globular organs considered to be pycnidia, corresponding to the peridia of the Gymnoascaceae, although they do not contain true ascospores but pycnospores. A comparative study of the following genera of Gymnoascaceae was made: *Ctenomyces* (*C. serratus*), *Arachniotus* (*A. candidus* and *A. aureus*), *Gymnoascus* (*G. reesii*) and *Myxotrichum* (*M. chartarum* and *M. uncinatum*). When grown saprophytically and on artificial media, they all form bunches of aleuries, fusiform chlamydospores and various other organs similar to those of the Dermatophytes. On very rich artificial media the peridium does not remain globular as in the saprophytic state, but spreads out and dissociates, and then closely resembles the cultures of certain Dermatophytes on artificial media. The author has also observed this phenomenon, which is very common in fungi which form perithecia, or sporodichia, in the genera *Volutella*, *Fusarium*, *Coremium* and *Coniosporium*. While the reproductive organs of these fungi, when returned to poor saprophytic media, resume their normal aspect, such is not the case with the Dermatophytes, which on artificial media give the dissociated forms, and in the saprophytic state on natural media give rudimentary perithecia. Analogous vegetative and reproductive organs common to both the Gymnoascaceae and the Dermatophytes are: raked-shaped cells, pectinate and spiral hyphae, nodular organs, aleuries, endoconidia, arthrospores, chlamydospores, fusiform spores, etc. Further, pleomorphism occurs in *Ctenomyces* as well as in various Hyphomycetes such as *Stemphylium*, *Alternaria*, and *Macrosporum* grown on artificial media rich in carbohydrates.

These results are considered sufficiently conclusive to justify the placing of the Dermatophytes in the Gymnoascaceae.

After a review of previous classifications, the Gymnoascaceae are divided into 3 sub-families: *Eugymnoasceae* Nannizzi, 1926, with the genera

Myxotrichum Kunze, 1823, *Amaurascus* Schroeter, 1893, *Gymnoascus* Baranetsky, 1872, *Ctenomyces* Eidam, 1880, *Arachniotus* Schroeter, 1893, and *Eidamella* Matruchot and Dassonville, 1901; *Nothogymnoasceae* Nannizzi, 1926, with the two genera *Myxotrichichella* Saccharo, 1892, and *Ateleothylax* Ota and Langeron, 1923; and *Atelogympnoasceae* Grigoraki, 1924, with the genera *Trichophyton* Malmsten, 1884 (em. Ota and Langeron, 1923), *Sabouraudites* Ota and Langeron, 1923, *Bodinia* Ota and Langeron, 1923, *Endodermophyton* Castellani, 1909, *Grubyella* Ota and Langeron, 1923, and *Epidermophyton* Lang, 1879 (em. Ota and Langeron, 1923). The species in which he found pycnidia, *Sabouraudites asteroides*, *S. radiolatus*, *Trichophyton denticulatum*, and *T. felineum*, are put in the genus *Ateleothylax*.

P. Tate.

DE MAGALHÃES (Octavio) & NEVES (Aroeira). [In Portuguese & English.] Ensaios de mycologia. (Contribuição para o estudo dos cogumelos em Bello Horizonte). **Essays on Mycology: (Contribution to the Study of Fungi in Bello-Horizonte).**—*Mem. Inst. Oswaldo Cruz*. 1926. Vol. 19. No. 2. In Portuguese pp. 245–283. With 63 figs. (1 coloured) on 36 plates. In English pp. 285–322. [Refs. in footnotes.]

In the course of the investigation the following fungi were found: *Endomyces albicans*, common in the saliva of children. *Oidium braziliense*, not uncommonly found associated with tuberculous-like lesions of the lungs. *Malassezia furfur*, in about 16 cases of pityriasis versicolor. *Aleurophora benigna*, n. sp., causes a benignant skin disease and is related to, or possibly identical with, *Malassezia*. In all of 30 cases of Sporotrichosis the parasite was *Sporotrichum beurmanni*. *Epidermophyton inguinale* was isolated from 4 of 8 cases of eczema marginatum. *Trichophyton equinum* Matruchot & Dassonville, was found in a case of ringworm of the beard. Microsporums were found in 24 cases: *M. lanosum* in 18; *M. audouini* in 5; *M. felineum* in 1. *Achorion schonleinii* was found in 4 cases of favus; and *A. gallinae* was found in favus of the fowl. Six cases of blastomycoses were also met with.

P. T.

BROCQ-ROUSSEU, GUILLIERMOND & DES CILLEULS (L.). Etude d'un champignon pathogène du genre *Monilia*. [**On a Pathogenic Monilia.**]—*Ann. Parasit. Humaine et Comparée*. 1927. Jan. 1. Vol. 5. No. 1. pp. 48–62. With 5 text figs. [4 refs.]

A fungus was isolated from the sputum of a patient admitted to hospital with bronchitis, bad general health and a temperature of 37·2°. His condition became worse, breathing became difficult, pulse rapid, temperature 40·9°, and clinical signs of pneumonia of the right lung developed. There was copious expectoration of non-foetid sputum in which the Koch bacillus could not be found; but numerous hyphae were present. The patient was then treated with potassium iodide for 20 days and was completely cured.

On Sabouraud's medium the fungus forms thick, white colonies with punctiform edges. In beerwort the optimum temperature is 30–40°, and at first the growth consists almost entirely of yeast cells; later simple or branched hyphae, which sometimes bud, are developed and giant cells are frequently found. Asci are not developed. Saccharose is inverted, and maltose, dextrose, levulose, mannose and dextrine are fermented

to a decreasing degree. Galactose, lactose and raffinose are not attacked, and amylase is not secreted. Gelatine is liquefied, and milk is coagulated in 12-15 days and the clot later digested, but the colour of litmus milk is not changed. It grows aerobically or anaerobically, is killed by a temperature of 55° for 15 minutes, and grows on a medium containing 30 per cent. of potassium iodide, but is killed by 35 per cent.

The fungus is placed in the genus *Monilia* and is regarded as a new species as it cannot be identified with any of those previously described. Intravenous injection of rabbits and guineapigs is fatal in about a week and recultivation of the fungus is possible from the blood of the heart.

P. T.

SHAW (Frederick W.). **A *Monilia* from the Respiratory Tract.**—*Jl. Lab. & Clin. Med.* 1927. July. Vol. 12. No. 10. pp. 968-972. With 6 text figs. [4 refs.]

A *monilia*, which is considered to be a new species and is named *Monilia richmondi*, was isolated from the sputum of a coloured woman suffering from a pulmonary affection suggestive of tuberculosis. The tubercle bacillus was not found in the sputum by direct examination or by guineapig inoculation. The fungus occurred as whitish granules of matted hyphae and yeast cells in the sputum.

Intraperitoneal inoculation of rabbits and guineapigs was negative; but when injected into the circulatory system of rabbits death, following tetanic convulsions, occurred about the fifth day, and the kidneys, liver, stomach wall and omentum were studded with small whitish granules from which the fungus could be recultivated. Intracardial inoculation of guineapigs produced similar results, as did intrapulmonary inoculation of a rabbit, but in this case there was first caseation and necrosis at the point of inoculation.

P. T.

DE SMIDT (F. P. G.). **A Type of *Monilia* in a Case of Suspected Pulmonary Tuberculosis in a European.**—*Kenya Med. Jl.* 1927. Jan. Vol. 3. No. 10. pp. 272-274. [3 refs.]

A new *Monilia*, *M. kenyaensis*, was isolated from the sputum, in which the tubercle bacillus could not be found, of a patient whose condition simulated pulmonary tuberculosis. A brief morphological and biochemical description of the organism is given. Animal inoculation was negative.

P. T.

WALLACE (G. I.) & TANNER (F. W.). **An Etiological Agent in Bronchomycosis.**—*Amer. Rev. Tuberculosis.* 1927. Mar. Vol. 15. No. 3. pp. 373-379. With 4 figs. [13 refs.]

A fungus closely resembling *Monilia albicans* was isolated from the sputum of a case of suspected tuberculosis in which no acid-fast bacilli could be found. The fungus is not pathogenic for experimental animals. Treatment with potassium iodide greatly improved the patient's condition.

P. T.

NIÑO (Flavio L.) & PUGLISI (Alfio). Moniliasis bucal. Su estudio clínico y micológico. [**Buccal Moniliasis.**].—*Semana Méd.* 1927. Jan. 27. Vol. 34. No. 4 (1724). pp. 222-229. With 9 text figs. [8 refs.]

A girl, 7 years of age, came to hospital with a history of having suffered for 5 months with a condition which was diagnosed as "thrush." Treatment with potassium chlorate and mouth-washes proved ineffectual; iodine in potassium iodide was better, but cure was rapidly obtained by injections of iodized oil (aceite yodado). Cultivation of the deposit showed it to be a *Monilia* and animal inoculations were made into a guineapig, a white rat and a rabbit, the two former intraperitoneally, the last in the marginal vein of the ear. In the guineapig and the rat a small nodule arose at the site of inoculation, but soon disappeared. The rabbit died 40 hours after inoculation and the mould was found in the kidneys. The authors regard the fungus as a new species which they name *Monilia buccalis*.

A note is added to the paper saying that the child had had a return of the condition.

H. Harold Scott.

GARCIA (O.), GARCIA (Cecile), BOYCE (Nancy) & BROWN (G. O.). **Bacteriological Characteristics of *Monilia* found in Pernicious Anemia and certain other Pathological Conditions.**—*Proc. Soc. Experm. Biol. & Med.* 1927. Mar. Vol. 24. No. 6. pp. 497-500. With 1 chart in text. [4 refs.]

WOOD recently suggested the possible relationship between *Monilia* and pernicious anaemia, and reported that he had isolated *M. psilosis* from the stools of some patients. The present paper deals with the bacteriological characteristics of strains of *Monilia* which the authors isolated from 9 out of 10 cases of pernicious anaemia, and compares them with a large number of other strains, some of which are ordinary saprophytes and others are strains which have been isolated from cases of affections such as diarrhoea, bronchitis, thrush, etc. In all, 50 strains were studied, all of which, except one, gave similar growth on French [Sabouraud's] proof agar. According to the manner of growth on gelatine the strains are of three types: first, grow only along the stab and do not liquefy the gelatine; second, do not liquefy the gelatine but send mycelial extensions into it giving the inverted pine-tree appearance; and, third, those which liquefy the gelatine. Four of the pernicious anaemia strains are of the first type, and the remaining 5 are of the second type. Fermentation tests were made with 14 different sugars, and, on the basis of acid production or not in the various sugars, the strains fall into 8 general groups.

P. T.

ZEISLER (Erwin P.). ***Monilia* Infection of the Tongue.**—*Arch. Dermat. & Syph.* 1927. Feb. Vol. 15. No. 2. pp. 171-185. With 9 text figs. [13 refs.]

Monilia pinoyi was isolated from a case of exanthem of the tongue, consisting of narrow, branched, slightly raised white lines on the dorsum and sides. The patient, a female aged 56, had bad general health with a diagnosis of polycythemia vera. The organism was pathogenic for rabbits and increased in virulence on passage through animals, first

causing death in 3-5 days, and later in 24 hours. The kidneys were the organs most affected and showed multiple miliary abscesses. Recultivation from the blood of the heart, the liver and the kidneys was possible.

Scrapings from another case of an infection of the lips and tongue showed yeast cells and mycelium. Cultures of mixed bacterial and fungus growths were obtained, from which a *Cryptococcus* and a filamentous fungus were isolated, but neither was pathogenic for rabbits.

P. T.

MONTPELLIER (J.) & CATANEI (A.). Sur une glossite observée à Alger. Etude du champignon présent au niveau des lésions. [On a **Glossitis observed in Algiers.**—*C.R. Soc. Biol.* 1927. May 20. Vol. 96. No. 16. pp. 1278-1280. [1 ref.]

A glossitis of distinct clinical type was observed in Algiers in a European aged 40 whose general health was good. It was of five years' duration and did not yield to six months' treatment with arsenic, bismuth, mercury and potassium iodide.

Numerous branched, septate hyphae, 3-5 μ wide, and some ovoid cells 4-6 μ in diameter were present in pellicles removed from the lesions. From the lesions a *Monilia* was cultivated, which differs morphologically from *M. albicans*, but closely resembles an organism recently isolated by the authors from a typical case of "thrush" and from a superficial glossitis. [*C.R. Soc. Biol.* Vol. 95. pp. 568-569; this *Bulletin*, Vol. 24, p. 320.]

P. T.

PANAYOTATOU (Angelique). Sur une "Mycose" isolée de la langue d'un malade. "*Penicillium linguae* (genre *Scopulariopsis*)."
[On "*Penicillium linguae*" isolated from a Case of Mycosis of the Tongue.]—*Cent. f. Bakt.* I. Abt. Orig. 1927. Jan. 3. Vol. 101. No. 4-5. pp. 231-235. With 6 text figs. [1 ref.]

A fungus, regarded as a new species, "*Penicillium linguae*" (*Scopulariopsis*) Panayotatou 1926, was isolated from a thick, dark brown, folded plaque on the tongue of a native child of Egypt, aged 2. Yeast cells were present in the scrapings and, on Sabouraud's medium, cultures, at first downy white, later greenish and finally brownish, thick and folded, were obtained.

Inoculation of guineapigs was negative. Subcutaneous inoculation of a rat led to death in a few hours, but the fungus was not found in the organs, although recultivation from the blood of the heart was possible.

P. T.

JONES (E. Lloyd). **Torula Infection of the Naso-Pharynx.**—*Southern Med. J.* 1927. Feb. Vol. 20. No. 2. pp. 120-125. With 4 text figs. [25 refs.]

This infection, consisting of large destructive lesions of the nose and throat, was provisionally diagnosed as of syphilitic origin, and, later, as lupus. The presence of yeast cells in material obtained by biopsy, and the cultivation of a yeast from the interior of the nodules present in the

throat, resulted in a final diagnosis of "Torulosis." Anti-syphilitic treatment resulted in rapid breaking down of the affected tissue; application of ultra-violet rays was ineffective; administration of iodides led to rapid necrosis; but the application of the roentgen ray in dosage to stimulate fibrous tissue formation led to notable improvement and the infection is at present in an arrested condition.

P. T.

DUARTE (João Galdino). Mycose pulmonar pelo "Oidium Brasiliense." [**Pulmonary Mycosis due to *Oidium brasiliense*.**—*Brasil-Medico*. 1927. Feb. 12. Vol. 41. No. 7. pp. 131-135. [1 ref.]

The patient was a man of 23 years with good family and personal history till some two months before he came under the author's observation. He was pale, emaciated, and had a troublesome cough with expectoration. Examination for tubercle bacilli and for syphilitic infection proved negative, but *Oidium brasiliense* was found in the sputum and a positive Bordet-Gengou reaction was obtained with this as antigen.

Treatment by iodide of potassium in doses of 2, 4, and up to 8 gm. in the day, taken by mouth, the total amount being 32 gm., resulted in speedy cure.

H. Harold Scott.

DA FONSECA (O.) & LEÃO (A. E. de Arêa). Sobre o granuloma coccidioidal. Formas de evolução nos tecidos, no pus dos ganglios lymphaticos e nas culturas do "Coccidioides immitis." Posição systematica do parasito. [**Coccidioidal Granuloma. Developmental Forms in the Tissues, the Pus of Lymph-Glands and in Culture. Systematic Position of *Coccidioides immitis*.**—*Bol. Inst. Brasileiro de Sci.* Rio de Janeiro. 1927. Feb. 25. Vol. 3. No. 2. pp. 21-24.

European blastomycoses differ entirely from those seen in Brazil, not only in the characters of the parasite, but in the clinical features of the disease they set up.

The fungus in the authors' case [no information is given as to the case itself] grew on ordinary media, as well as on Sabouraud's, best between 25° and 30° C. The first colonies appeared after three weeks and were small, ashy-grey and smooth, and on them aerial hyphae produced a growth like cotton. The colonies are composed of septate mycelial filaments. On ordinary agar they give a dirty yellow growth easily separable from the medium. In broth, the growth falls to the bottom, leaving the liquid clear. The original elements consist of rounded forms with a doubly-contoured periphery, 5-80 microns in diameter, and reproducing by endogenous sporulation.

The parasite proved to be identical with that discovered in the Argentine in 1890 and described later by RIXFORD and GILCHRIST in America under the name *Coccidioides immitis*. The author regards it as belonging to the Family Protomycetaceae and closely allied to the Ascomycetes, and suggests that some of these may pass beyond the phytoparasitic stage and in man set up the condition known as blastomycosis.

H. Harold Scott.

TROPICAL DERMATOLOGY.

LINDBERG (K.). Aperçus dermatologiques dans le nord de l'Inde anglaise. [*Dermatological Notes on the North of British India.*]—*Rev. Méd. et Hyg. Trop.* 1927. Sept.-Oct. Vol. 19. No. 5. pp. 129-135. [5 refs.]

This article contains a very brief survey of some dermatological conditions among the natives of India compared as regards their clinical appearances and incidence with those seen at home. The common skin affections of Western Europe are in a minority in India where parasitic dermatoses predominate. The large and seasonal incidence of fungus infections is ascribed to maceration of the skin by excessive sweating in the humid climate. The prejudicial aversion of the native to vitiligo lesions is mentioned.* More detailed reference to tinea cruris, tropical ulcer and prickly heat is made. The lesions of tropical ulcer require thorough curettage before applying any local dressing such as a powder of ac. boric. 3 parts, iodoform 1 part. The etiology of prickly heat is not yet clear.

W. Jenkins Oliver.

HASEGAWA (M.). Ueber die Dermatomykosen in Formosa mit besonderer Berücksichtigung ihrer Erreger. [*Dermatomycoses in Formosa.*]—*Japan Jl. Dermat. & Urol.* 1927. Feb. Vol. 27. No. 2. German summary pp. 7-10. With 8 figs. on 3 plates (1 coloured). [In Japanese pp. 1-152. With 36 text figs.]

One hundred and twelve cultures were obtained from 203 cases:—92 from trichophytoses (160 cases), 27 from favus (37 cases), and 3 from tinea imbricata (6 cases). The fungi found in the various kinds of trichophytoses were: *Microsporium japonicum* Dohi and Kambayashi 42, *Trichophyton violaceum* Bodin 35, *T. coccineum* Kato 6, *T. radiolatum* Sabouraud 7, *T. interdigitalis* 1, and *Epidermophyton inguinale* 1. Thus, although the southern half of Formosa is in the tropical zone, the clinical aspect and the parasites of the prevalent ringworms agree with those of other parts of Japan.

Favus is widely distributed among the natives of the west coast, and 37 cases of favus of the head were found among native school children. Nine were due to *Achorion Schönleinii*, and 18 to a new species named *Achorion formosum* (or *Grubyella formosense* according to LANGERON & OTA's classification). The scales produced by this species are peculiar in being usually greyish white, but typical yellow favus scales are also found. Diseased hairs are dull and easily pulled out, but do not break off. Chains of small roundish spores 3·5-4 microns in diameter run longitudinally in the hair extending into the part projecting beyond the follicle and deep into the bulb. Spores and undulating hyphae 3-4 microns wide are present in the scutula. Cultures on Sabouraud's glucose agar are first clear yellow and moist, but become brownish in a couple of weeks. The part above the medium is irregularly folded and the submerged part radiates in a root-like manner. After a couple of

* It is stated that young persons with depigmented patches, whether visible or not, are not acceptable by either side as marriage partners, and that such patches are attributed to leprosy which is considered by the Hindus to be punishment for particularly heinous sins committed in a previous existence. [Ed.]

months white patches appear on the surface and later develop into a white down. The mycelium is branched and septate and forms chlamydospores, intercalary and pediculated; chains of small spores; "chandeliers faviques"; nodular organs; non-fertile sporiferous hyphae; and yellow bodies of Kralschen. It is easily inoculable to rabbits, but not to mice, dogs or monkeys.

From *tinea imbricata* 3 cultures were obtained, all being easily inoculable on human skin. The cultures resemble *Endodermophyton tropicale* Castellani.

P. Tate.

ACTON (Hugh W.) & MCGUIRE (C.). *Tinea cruris: its Manifestations, Diagnosis and Treatment.*—*Indian Med. Gaz.* 1927. Aug. Vol. 62. No. 8. pp. 419–428. With 8 plates (2 coloured). [Sch. Trop. Med., Calcutta.]

A well illustrated communication containing a useful detailed account of the disease as seen in India. Difficulty in diagnosis would seem to depend upon the frequent secondary pyogenic infection and the trouble involved in the detection of the fungus, preparations in 40 per cent. potash often requiring 24 hours' clearing for its definition. Infection occurs where the epidermis is thinnest, especially the cleft between the 4th and 5th toes. The conditions necessary for infection relate to moisture, warmth and friction. Children do not usually suffer. The nails of the fingers are more commonly affected than those of the toes, probably as a result of scratching. "*Tinea cruris* never extends above the neck on to the face although it may attack any other part of the body." A secondary streptococcal infection is the commonest complication. This may occasionally lead to a cellulitis or sometimes to a generalized condition with the appearance of an exfoliative dermatitis. These cases are frequently a mixture of streptococcal infection and arsenical dermatitis following treatment for supposed syphilis. Secondary staphylococcal infection is frequent, while among natives secondary contamination with *B. tuberculosis* may give rise to warty lesions.

In describing the cultural characteristics of the *Epidermophyton*, it is asserted that the colour variations of the cultures are due to substances in the media and not to varieties of species. Treatment in the acute stages with secondary infection and bullous or vesicular lesions consists in the frequent application of calamine lotion (allowed to evaporate) during the day and a 1–2 per cent. mercurial ointment at night. For those cases showing a marked staphylococcal infection acriflavine solution 1:1000 is recommended. As soon as the lesions are dry, Whitfield's ointment is advised. In mango toe, with great thickening of the skin in the interdigital clefts, the affected area may be painted with Resorcin 1 drachm in Tr. Benzoin Co. 1 oz. This is to be applied at night, but requires careful observation and control. Chronic cases, which do not react to ointments, etc., are benefitted by X-rays, both filtered and unfiltered, frequently in fractional doses. To prevent infection or reinfection after cure a sulphur camphor dusting powder is recommended for application to the feet and groin on alternate days with a simple absorbent powder, for the purpose of keeping these regions dry.

W. J. O.

SMITH (E. C.). **Dermal Moniliases among Natives of West Africa.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1927. Aug. 31. Vol. 21. No. 2. pp. 125–130. With 21 figs. on 8 plates. [8 refs.] [Med. Research Inst., Lagos, Nigeria.]

The clinical appearances of the disease are described and the clinical resemblance to those of ringworm infection is noted. The scrotum is the area most frequently affected and shows all variations in appearance, from merely a white dry fluffy scaling of the skin to an exfoliative eczematous condition. On the trunk and limbs the lesions may appear as psoriasiform patches, as irregular shining macules resembling creased silver paper, as impetiginous lesions or as eczematoid dermatitis. Differentiation from other mycotic infections is to be made only by microscopical, cultural and histological examinations. A positive microscopical finding may be regarded as reliable. A positive culture alone does not exclude the saprophytic presence of fungi. The monilia culture should appear in 4 to 7 days as an opaque white growth, in some strains pink, on Sabouraud's medium. For histological examination the section should be made through a hair follicle. "In no case has the fungus been demonstrated with certainty within the hairs. The typical yeast-like character of the budding or sporulation is very striking in monilia affections and is shown to advantage in sections." This communication is well illustrated.

W. J. O.

CASTELLANI (Aldo). **Note on the Occurrence of Various Tineae in New Orleans. With Remarks on *Trichophyton Louisianicum*.**—*New Orleans Med. & Surg. Jl.* 1927. June. Vol. 79. No. 12. pp. 896–899. With 3 text figs. [1 ref.]

The various tineae occurring in New Orleans are briefly mentioned. Epidermophytosis is extremely common; the microsporon, trichophyton and favus infections are comparatively rare; *T. imbricata* is absent. The *T. louisianicum* produces (1) a dry type of lesion on the glabrous skin consisting of white patches with pityriasis desquamation, often showing in association with it a large number of yeast-like organisms which might account for the depigmented appearance, and (2) moist crusted rather than scaly lesions. The biological and cultural characteristics of this fungus are described and contrasted with those of other members of the genus *Trichophyton*.

W. J. O.

HASHIMOTO (T.), ISHIBASHI (T.), IWATAKE (H.) & OTA (M.). **Le favus en Mongolie et son champignon causal: *Grubyella Schönleinii* var. *Mongolica* n. var. Hashimoto et Ota. [Favus in Mongolia and its Causal Fungus.]**—*Japan. Jl. Dermat. & Urol.* 1927. May. Vol. 27. No. 5. French summary pp. 33–35. [In Japanese pp. 386–409. With 16 text figs.] [Dermato-Urol. Clinics, Faculty of Med., Mukden & Nagoya.]

Cultures were obtained from 30 of 59 cases of ring-worm met with in Mongolia; 22 were the same species, and are considered to be a new variety which is called *Grubyella schönleinii* var. *mongolica* n. var. Hashimoto & Ota. The favus it occasions may have typical cups; small cups tightly inserted into the follicle; or the cups may be

completely absent, when the clinical aspect closely resembles microsporosis. It was most prevalent in males between 3 and 45 years, and was especially frequent between the ages 10 and 15.

Cultures on Sabouraud's peptone agar for the first three generations appear as discs of a maroon colour with fringed margin and irregularly radiating furrows. Later generations have cultures closely resembling those of *G. schönleini* Lebert 1845. On glucose and maltose agar the early generations are similar to those on peptone agar, but the aspect changes in later generations and comes to resemble cultures of *Trichophyton flavum* Bodin or *T. plicatile* Sabouraud. The morphology of the mycelium is practically the same as that of *G. schönleini*.

It cannot be inoculated to man if he is already infected, or is infected with syphilis. Mice are very susceptible and inoculation results in deep ulceration; but guinea-pigs and rabbits, when inoculated by cutaneous scarification, suffer only a desquamation lasting a few days. Intravenous inoculation of rabbits with cultures caused death, and sub-cutaneous inoculation led to abscess formation at the point of inoculation.

The cuti-reaction was not specific, and fixation of the complement was positive with serum of rabbits sensitized by cultures, but negative to serum of favus patients.

P. Tate.

AMBROSOLI (G. A.). Coltura di *Achorion Schönleini* dal sangue circolante in un caso di tigna favosa. [*Achorion schönleini* cultivated from the Peripheral Blood in a Case of Favus.]—*Policlinico*. Sez. Prat. 1927. Apr. 4. Vol. 34. No. 14. pp. 487-488.

A boy of six years had a patch of favus on the head and he gave a positive intradermal reaction to the fungus without general symptoms. The author took some blood on to Pollacci's glucose-agar and in 6-7 days small white spots appeared which became confluent in 15-16 days and had the morphological characters of *Achorion schönleini*.

H. Harold Scott.

GAMMEL (John A.). The Etiology of Maduromycosis with a Mycologic Report of Two New Species observed in the United States.—*Arch. Dermat. & Syph.* 1927. Mar. Vol. 15. No. 3. pp. 241-284. With 20 text figs. [68 refs.]

This paper first gives a long general and historical account of Maduromycosis and Actinomycotic mycetomas. In the United States 21 cases of mycetoma have been reported, of which 18 were actinomycoses (mycetomas due to *Microsiphonales*) and 3 maduromycoses (mycetomas due to *Eumycetes*). To these are added 3 hitherto unpublished cases, making 6 cases of maduromycoses in all, of which 4 were of the black-grained variety. Two of the latter cases are described in detail both clinically and mycologically. Fungi isolated from both cases belong to the genus *Madurella*, and differ from each other and from previously described species. They are considered to be new species and are named *Madurella americana* and *M. ikedai*. Neither is pathogenic for animals. These new species bring the total number of fungi observed in cases of maduromycoses up to 19, distributed among the genera *Madurella* (8), *Indiella* (3), *Glenospora* (2), *Scedosporium* (2), *Allescheria* (1), *Aspergillus* (1), *Sterigmatocystis* (1), and *Penicillium* (1).

P. Tate.

MONTPELLIER (J.), CATANEI (A.) & CLAPIER (P.). Etude d'un mycétome à grains noirs dû à *Glenospora clapierei* Catanei, 1927. [**A Mycetoma with Black Grains.**].—*Bull. Soc. Path. Exot.* 1927. June 8. Vol. 20. No. 6. pp. 502–511. With 4 text figs. [5 refs.]

The patient, a Singhalese who had been stationed one year in Algiers, had a tumour about the size of a nut lying along the right maxilla. The skin adhered to the tumour, was not changed in colour, and had several small apertures from which no fluid could be expressed. Puncture allowed the escape of rather thick yellowish pus containing numerous small black grains.

The grains are black, of varying form, and are usually smaller than the head of a pin. They are formed of closely interlaced hyphae averaging 2.5μ in diameter, and of more or less globular bodies which may attain a size of 8.5μ by 6.5μ , and which may be terminal or intercalary. The grains are not differentiated into zones.

Growth was readily obtained from the grains on Sabouraud's glucose agar at 37°C . Cultures are black, shining, and are covered with numerous pointed projections 1–2 mm. high. Later, the cultures become covered with a grey down. The characters on various other media are briefly described.

The mycelium is composed of septate hyphae, $2.5\text{--}3\mu$ in diameter, and sometimes of a more or less dark brown colour. There is a tendency for numbers of hyphae to aggregate into fascicles. Terminal and intercalary aleuries are developed, which are generally ovoid and vary in size from $6.5\text{--}9\mu$ by $5\text{--}6\mu$. Terminal and intercalary chlamydospores $10.5\text{--}15\mu$ by $9\text{--}15\mu$ are occasionally found. The fungus is identified as a *Glenospora*, but differs from any known species and is consequently named *Glenospora clapierei* Catanei, 1927.

Animal inoculation was negative.

P. Tate.

PIJPER (Adrianus) & PULLINGER (B. Davidine). **South African Nocardias.**—*Jl. Trop. Med. & Hyg.* 1927. June 15. Vol. 30. No. 12. pp. 153–156. With 7 figs. on 2 plates. [13 refs.]

Mycetoma is not rare in South Africa but, in contrast to North Africa, it is always actinomycotic. Detailed accounts of three cases of mycetoma are given, in each of which the parasite is regarded as being a new species.

The first case was of an adult native and involved the upper part of the right breast and arm. The grains were yellowish and possessed typical clubs. Cultures, which were obtained on blood-agar, are strictly aerobic and have a mouldy odour. Hay-extract proved the best simple medium for growth. There is a tendency to form an orange pigment, which varies in intensity on different media. Intraperitoneal inoculation of guineapigs with 1 cc. of a fine suspension of the mycelium gave rise to lesions in the peritoneal cavity chiefly affecting the omentum. The organism is named *Nocardia preloriana* Pijper & Pullinger 1927.

The second was a case of mycetoma pedis extending over the malleoli, and the grains were whitish and showed typical clubs. Cultures, obtained on blood-agar, are strictly aerobic and soon form a white chalky efflorescence on the medium. Its pathogenicity to animals is similar to that of the first species. It differs in certain characters from the previous species and from other known species, and is named *Nocardia transvalensis* Pijper & Pullinger 1927.

The third was a typical case of mycetoma pedis. The grains were peculiar in being bright carmine in colour and very hard. Clubs were not present. Cultivation was difficult and very slow, and no growth was obtained on any of the common media such as broth, potato, agar, hay-extract, etc. On blood-agar the cultures, which are strictly aerobic and have no odour, grow well and after a time produce a red colour. Litmus milk is a good medium for growth and is coagulated without change in reaction after 8 days. On this medium bright red colonies of the fungus are developed towards the surface. The pathogenicity to animals is the same as that of the two previous species. This species is named *Nocardia africana* Pijper & Pullinger 1927.

P. Tate.

DA FONSECA, Filho (O.) & LEÃO (A. E. de Arêa). Sobre o "Scedosporium apiospermum," cogumelo productor de mycetomas na Italia e no Brazil. [*"Scedosporium apiospermum," a Cause of Mycetoma in Italy and Brazil.*].—*Bol. Inst. Brasileiro de Sci.* Rio de Janeiro. 1927. Feb. 25. Vol. 3. No. 2. pp. 24-25. Also in *Scienza Med.* 1927. Sept. Vol. 5. No. 9. pp. 536-539. With 7 text figs. In English pp. 539-540.

This fungus has been found by TAROZZI and others in Italy and by SEVERIANO in Brazil, and was named by SACCARDO *Scedosporium apiospermum*.

It grows readily on potato and on Sabouraud's media, as white cotton-like colonies, slightly invading the medium and producing a greenish-black pigment. Three types of reproductive elements are seen: (1) Pyriform conidia, especially abundant on Czapeck's agar, and arising at the termination of a mycelial filament; (2) Fusiform spores curved so as to appear crescent-shaped when viewed on the side, surrounded by a thin membrane and constricted from the mycelial thread, only one to each; (3) Chlamydospores, after several days' growth, particularly numerous on Sabouraud maltose; they may be intercalary or terminal, in groups of two to five elements.

The grains of the form of mycetoma produced by this are present in small numbers only and are of a bright yellow colour, and about 3 mm. in diameter.

H. Harold Scott.

GELONESI (Gregorio). Due nuovi parassiti del "Piede di Madura." Studio sui micetomi della Somalia Meridionale. [*Two New Parasites of Madura Foot. A Study of Mycetoma in Southern Somalia.*].—*Ann. di Med. Nav. e Colon.* 1927. May-June. Year 33. Vol. 1. No. 5-6. pp. 283-308. With 8 text figs. [15 refs.] [*"A. Cecchi"* Hosp., Villabruzzi (Somali) & School of Naval Hyg., Naples.]

Of the various forms of mycetoma in Somalia, that with white or yellow granules and that with black are common; that with red granules is not seen. Two cases are reported in detail in both of which the granules were black in colour, but not due to any of the usual parasitic fungi. In the first the destruction was limited to the connective tissue, the subcutaneous fat being replaced by a firm fibrous growth with small cavities or cysts containing greyish viscid purulent material. From this was cultivated one of the Phycomycetes, allied to the Mucoraceae. The hyphae were septate, branching, with

very distinct walls, reproducing by direct fission and lateral gemmation. They terminated by a sporangium without any columella, but with abundant black pigment. The author names it *Mucor mycetomi*.

The fungus in the second case grew as a mycelium with thin, septate elements, slightly branching, reproducing by fission and by chlamydospores. They terminated in asci each containing four to six spores with sprinkling of black pigment. It is thought to belong to the *Aspergillus* group and is therefore designated *Aspergillus mycetomi villabruzzii*.

Not having any of Sabouraud's media at hand the author employed banana and obtained good growth.

H. Harold Scott.

PASQUINI LOPEZ (Carlos). Un caso de pie de Madura. [**A Case of Madura Foot.**]—*Bol. Inst. Clin. Quirurg.* Buenos Aires. 1927. Vol. 3. Nos. 21-25. pp. 829-832. [Also issued as *3a Reunión, Soc. Argentina Patol. Regional del Norte, Tucumán, Julio, 7, 8 y 10, 1927.* pp. 721-724.]

General remarks on this condition, illustrated by the case of a man, 23 years of age, who sustained an injury to the right foot in 1919. This suppurated and was very slow in healing. Later a papule appeared in the scar and discharged a little blood-tinged fluid; there was a hard, indurated border. He came to hospital where the ulcer and surrounding parts were excised. The wound healed well, but six months later a nodule appeared in the scar and ulcerated. Others then arose in the neighbourhood and the whole foot became swollen and indurated, and on the dorsum and sides were numerous papules, ulcers and sinuses. The discharge contained granules the size of a pin's head. There was osteomyelitis of the os calcis and new foci were constantly forming, so amputation was decided upon. Cure was rapid.

H. Harold Scott.

SANTILLAN (Prudencio) & PALACIOS (Gerardo). Discomycosis de la pierna. [**Discomycosis of the Leg.**]—*Bol. Inst. Clin. Quirurg.* Buenos Aires. 1927. Vol. 3. No. 21-25. pp. 825-828. With 5 text figs. [Also issued as *3a Reunión, Soc. Argentina Patol. Regional del Norte, Tucumán, Julio, 7, 8 y 10, 1927.* pp. 717-720 & illustrations.]

Illustrations of the conditions present in this patient show a very extensive involvement of the leg with large numbers of ulcers and sinuses. Cultivation of the fungus was obtained on Sabouraud-maltose. Treatment was tried with antisyphilitic remedies and vaccines of pyogenic cocci, iodide, etc., but without effect, and amputation had to be performed.

H. Harold Scott.

CLELAND (J. Burton). **A Case of Systemic Blastomycosis with the Formation of a Myxomatous-Looking Tumour-Like Mass.**—*Med. Jl. Australia.* 1927. Mar. 5. 14th Year. Vol. 1. No. 10. pp. 337-340. With 1 text fig. [7 refs.]

This is the first case of blastomycosis observed in Australia, although not the first to be published. The patient, a male aged 47, towards the end of 1915 developed a swelling about 4 inches in diameter situated on the mid-point of the right iliac crest, which was tender on palpation and presented the clinical appearance of a sarcoma. The tumour was excised, and microscopical examination of the material revealed the presence of numerous budding yeast-cells, 8-15 microns in diameter.

Local treatment, consisting of curettage and irrigation with quinine ; and general treatment with salvarsan, potassium iodide and emetine were unavailing and death occurred in April, 1916.

Cultures of the organism were not obtained and animal inoculation was negative.

P. Tate.

DAHLMANN (Fritz). Ein Fall von Pseudo-Creeping Disease. [**A Case of Pseudo-Creeping Disease.**].—*Dermat. Woch.* 1927. Feb. 26. Vol. 84. No. 9. pp. 292-296. With 2 text figs. [9 refs.]

Case report of a woman, aged 28, who had observed the white streaks about the inguinal region of the right thigh for 3 years in association with distressing exudation of serum from a pin-head sized fistula on the inner aspect of the thigh of 2 years' duration prior to the appearance of the linear lesions. She could remember no trauma from bites of flies, nor was she in contact with cattle or horses. The lesions appeared as a series of white parallel lines, $\frac{1}{2}$ mm. broad and 3.0-3.5 mm. long, slightly raised above the skin surface. All tended to point towards a lentil sized red area of skin where the small fistula was situated. The histological picture showed a cavity lying in the cutis immediately below the papillary layer, with the epidermis stretched and slightly thickened over it. There was no apparent alteration of the elastic or connective tissues, no evidence of endothelial preformation. Surrounding the cavity was a considerable cellular infiltration consisting of round cells, polymorphonuclear leucocytes and fixed connective tissue cells (histiocytes) : no trace of any parasite. While the condition was not regarded as a case of true creeping disease, the unusual clinical picture was considered to be due to a parasitic infection rather than to some anomaly of the lymph system.

W. J. O.

SHINN (H. L.). **Creeping Eruption. Report of Case.**—*U.S. Nav. Med. Bull.* 1927. July. Vol. 25. No. 3. pp. 632-633.

Account of a case in which both feet were infected probably from contaminated sand of the beach. The organism was observed to travel about 1 inch per day, in no definite direction but with a circular tendency giving the appearance of ringworm. Lunar caustic applied over the course traced by the parasite and more heavily over its site, followed by 5 per cent. mercurochrome ointment, resulted in healing. No attempt was made to isolate the organism.

W. J. O.

GARZON (Rafael). Dermatitis eruptiva serpenteante linear. Su tratamiento. [**Creeping Eruption and its Treatment.**].—*Prensa Méd. Argentina.* 1927. Mar. 30. Vol. 13. No. 30. pp. 1008-1017. With 4 text figs.

The case is that of a child of $3\frac{1}{2}$ years, who had never been away from Cordoba. For six months there had been a sinuous creeping eruption, with much itching, extending from the left lumbar region to the shoulder, abdomen and chest, with many turns. It disappeared for 15 to 20 days at a time.

The usual advance was 3-5 cm. in 24 hours, but scratching seemed to stimulate the parasite and it moved as much as 8-10 cm.

Many forms of treatment were tried without effect, till, finally, a single application of ethyl chloride spray at the advancing spot brought about a cure. Other cases may require repetition of the treatment.

H. Harold Scott.

WHITE (E. F.) & DOVE (W. E.). **Dogs and Cats concerned in the Causation of Creeping Eruption.**—*U.S. Dept. Agr. Off. Rec.* 1926. Vol. 5. No. 43. p. 6. [Summarized in *Experiment Station Rec.* 1927. June. Vol. 56. No. 8. p. 776.]

From one of the places in the South Atlantic and Gulf States, U.S.A., where there is a high incidence of creeping eruption, the authors obtained from the faeces of dogs and cats a culture of larvae of *Ancylostoma brasiliense* and *A. caninum*. When applied to their own skin this culture produced symptoms and lesions clinically characteristic of creeping eruption.

R. T. Leiper.

HODARA (Menahem) & BEHDJET (Houloussi). Juckende, durch Getreide hervorgerufene Dermatosen im Orient. [**Itching Dermatoses in the East produced by Barley.**]—*Dermat. Woch.* 1927. Feb. 26. Vol. 84. No. 9. pp. 296-298.

Among the itch mites giving rise to itching dermatoses from contact with barley and straw, the authors have frequently been able to determine the presence of *Glycophagus*. Brief allusion is made to cases of pruritus occurring among the attendants of horses showing lesions about the lips and nasal orifices due to infection from their litter. An acute case in a tramp is described, with generalized swelling of the integument including the eyelids together with fever and albuminuria. The condition was diagnosed mainly by the history of the patient's having slept on straw. Another case is mentioned with the disease in acute form localized to those parts that had been in contact with a sack of straw in which the *Glycophagus* was found. Mild cases clear up entirely in the course of a few days without any treatment; for the more severe types saline baths are recommended. The parasite was never found in the skin lesions. The disease is not contagious and soon clears on removal from the source of irritation.

W. J. O.

PETER (F. M.). Bemerkungen zur Therapie der Tropenulcera. [**Remarks on the Treatment of Tropical Ulcer.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1927. Oct. Vol. 31. No. 10. pp. 447-459. [Works Hosp., Surinam Bauxite Co., Moengo, Dutch W. Indies.]

A general account of the disease emphasizes the purely local nature of the affection. Characteristic features of the ulcer are its penetrating odour, the adherent membranous covering, the rapidity of its extension, its obstinacy towards therapeutic measures and its tendency towards recurrence. Salvarsan treatment against the lesion itself is of no value, but is useful for diagnostic purposes in cases of supposed mixed infection. As a local application pyrogallic acid is recommended both for its antiparasitic properties and as a stimulant to new epithelial formation. This is used as a dusting powder—ac. pyrogallic 10, zinci oxidi 40, talc. veneti ad 100 parts—applied twice daily under a change of dressings. During its use the urine must be regularly and carefully examined, and the toxic effects of any absorption obviated by 10-15 minims of dilute hydrochloric acid given in water twice daily after meals. Some 3-4 days after new granulations have appeared the dusting powder is stopped. The area of skin surrounding the

ulcer must be protected, e.g., by boric vaseline, from the effect of the pyrogallol. Patients in hospital may be treated for the first 2-3 days with a compress of 1 : 4,000 silver nitrate solution during the day with the powder applied at night. The corners of the ulcer often prove more refractory towards the treatment than the remainder of the lesion and require a higher percentage (15-20) of pyrogallol. Long standing lesions may be treated at first with pyrogallol plaster cut to the size of the ulcer, after which they are dressed with the dusting powder. Two cases are reported and their progress noted under the treatment advocated.

W. J. O.

VAN BOMMEL (L. B.). De behandeling van het ulcus phagedaenicum tropicum met "Pyotropin." [**Treatment of Ulcus tropicum with Pyotropin.**—*Geneesk. Tijdschr. v. Nederl.-Indië*. 1927. Vol. 67. No. 2. pp. 323-325.]

The author experienced some difficulties in administering the usual methods of treatment to native dispensary patients. This induced him to give a trial to "Pyotropin," a proprietary medicine (Lupusan Gesellschaft m.b.H., Altona), which is said to act by a combination of keratolytics and caustics. The author recommends the use of this cure, which in 50 cases is said to have acted favourably. As the cure, however, causes pain just as much as any other, it is difficult to see the special advantages claimed for it.

W. J. Bais.

ARJONA (Vicente Rodriguez). Beitrag zur Kenntnis des "Pinta" (Mal del Pinto) auf der Halbinsel Yucatán. [**Pinta in the Peninsula of Yucatan.**—*Arch. f. Schiffs- u. Trop.-Hyg.* 1927. Oct. Vol. 31. No. 10. pp. 472-477. With 6 text figs.]

This somewhat inconclusive communication contains a short account of a depigmentary dermatosis occurring in Yucatan, chiefly among young persons of 10 to 25 years of age who are the offspring of "mixed" marriages. The condition may affect any area of the body; the lesions, of irregular shape and extent, may be single or multiple and consist of smooth, non-scaling macules without any subjective irritation or paraesthesia. In this respect they differ from the lesions of "pinta" or "caraté," endemic in other Mexican States. It is noted that the depigmented areas of skin are particularly sensitive to external irritants and markedly so to the solar rays. Scrapings from the lesions examined in potash and cultural experiments were all negative to the finding of any specific fungus, though the clinical features of the disease and its apparent transferability to others suggest a parasitic, probably fungoid, origin. It is suggested that the infecting agent may be present as a contamination of the ingested maize. Treatment by neosalvarsan in the early stages of the disease gives good results. For the long standing lesions, in which the skin has lost the property of pigment regeneration, the only remedy is the introduction into the skin of some dye.

W. J. O.

MENK (Walter). **Caraate in Colombia.**—*Fifteenth Ann. Rep. Med. Dept. United Fruit Company, Boston, Mass.* 1926. pp. 123–131. With 9 text figs. [2 refs.]

In this inconclusive, well-illustrated communication brief mention is made of 9 cases of caraate. The etiology of the disease is considered to be still debatable. While absent in the white type of the disease, numerous varieties of fungi may be found frequently in both the diseased and apparently unaffected skin areas in cases of the pigmented variety. Since the Wassermann reaction was positive in 74.5 per cent. of the writer's cases, diagnosed solely on clinical grounds, it is suggested that the development of the condition may be related to an old treponematosi, which suggestion is supported by the frequently beneficial effect of anti-syphilitic treatment.

W. J. O.

ESCOMEL (Edmundo). La dermatitis climática que se denomina chapetonada en Arequipa. [**"Chapetonada," a Climatic Dermatitis of Arequipa.**—*Crónica Méd.* Lima. 1927. June. Vol. 44. No. 768. pp. 176–180.]

"Chapetonada" has been regarded as an acclimatizing state affecting newcomers to Arequipa. The author, however, finds that it attacks those living at an altitude of 2,000–3,000 metres above sea-level when they descend to the plains. Within a few hours up to 4 days after arrival the patient feels a burning pain over practically the whole body coinciding with the outbreak of erythematous spots which grow in size and become a papular urticarial rash with raised centre. It affects the trunk, limbs, face and hands—the exposed parts more than those covered by clothing. The discomfort is worse at night and leads to much scratching. Later the papules become vesicular and even pemphigoid. In a few days (the duration is variable) the vesicles dry up, leaving no scarring. The condition clears much more rapidly if the patient returns to the higher levels. It is neither contagious nor does it ever become epidemic.

As regards treatment the most effective is return to the hills; if this is impracticable, an initial saline purge is prescribed and a lotion containing menthol and camphor in alcohol. When the purgative has acted, two or three drops of adrenalin taken three times in the day is beneficial; autohaemotherapy and autoserotherapy often prove very effectual.

H. Harold Scott.

VIDAL GUEMES (Adolfo) & ARIAS (Francisco J.). Una dermatosis regional. [**A Regional Dermatitis.**—*Bol. Inst. Clin. Quirúrg.* Buenos Aires. 1926. Vol. 2. No. 14, 15 & 16. pp. 541–545. With 1 text fig.]

A woman of 22 years presented herself with a rash of red papules, many of them vesicular, varying in size up to 3 cm. in diameter, and accompanied by intense itching and mild general pains. The rash came out suddenly three days previously and involved the face, ears, neck, forearms, hands, legs and feet.

It is a condition quite well known to the local inhabitants, who state that it occurs every summer in those who come down from the higher

levels to the coast, and they ascribe it to the bites of mosquitoes or other insects, and aver that it clears up without any treatment in a few days after return to the higher levels.

The question of diagnosis from other pruriginous papulo-vesicular eruptions is discussed, and by elimination this is believed to be the condition designated "chapetonada" by ESCOMEL (see this *Bulletin*, Vol. 23, p. 853 and above).

H. Harold Scott.

HUCHARD (G. L.). Pyodermite rebelle rapidement guérie par des pansements spécifiques d'après la méthode de Besredka. [Obstinate Septic Dermatitis cured by Specific Dressings (Besredka's Method).]—*Bull. Soc. Path. Exot.* 1927. June 8. Vol. 20. No. 6. pp. 546-547.

Case report concerning a woman, aged 27 years, in whom a polymorphic eruption of a bullous impetigo-ecthymatous type had recurred at intervals for 10 years, the attacks being of some weeks' to 3 months' duration and leaving always some pruriginous lesions. Local dressings of a filtrate of the broth-grown cultures of pus from an unbroken lesion repeated twice daily, together with injections of an autogenous vaccine, produced complete healing in 4 days.

W. J. O.

ANDERSON (T. Farnworth). A Further Case of Erythema simulating Scarlatina.—*Kenya & East African Med. Jl.* 1927. July. Vol. 4. No. 4. pp. 113-114.

Report of a case of generalized scarlatiniform erythema occurring in a woman, appearing on the third day of illness with fever and sore throat, lasting for one week and associated with a trace of albuminuria. The rash, tongue and sore throat appeared to be typical of scarlet fever, while the albuminuria developed at the onset of the rash to disappear with it. There was no later recurrence, nor development of nephritis. In none of the cases reported had any contact contracted the disease.

W. J. O.

DEN HARTOG (B. J. C.). De Amazone-voet (Strong, Shattuck en Wheeler). [Amazon Foot].—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1927. Vol. 67. No. 4. pp. 520-527. With 6 figs. on 2 plates. [3 refs.] [Military Med. Lab., Weltevreden, Java.]

A case of "dermal granulomatous spirochaetosis" [STRONG, SHATTUCK and WHEELER, *Med. Rep. of the Hamilton-Rice Seventh Expedition to the Amazon* [this *Bulletin*, Vol. 24, p. 325; 78 STRONG], is described and represented in good illustrations. It occurred in a Malay who had never left Sumatra.

STRONG found spirochaetes in the affected tissue (*Sp. noguchii*), and considered these to be the cause of the disease. Den Hartog, though able to find the same spirochaetes, cannot indiscriminately recognize them as the causal factor, but leaves the possibility open that they are secondary invaders of the diseased skin, especially because of their exclusive localization in the superficial layers.

Other possible etiologies are discussed ; the tissue was searched for Koch's bacillus, fungi and Leishmania, with negative result. Syphilis and yaws may be excluded as they have never been reported to give rise to such affections.

In view of the uncertainty of the etiology, the author thinks that the name given to the disease by STRONG is premature and for the time being he proposes the more non-committal name of "Amazon-foot."

W. J. Bais.

SÉNO (R.). Een eigenaardige huidaandoening ter diagnose. [**Peculiar Skin Affection for Diagnosis.**]—*Geneesk. Tijdschr. v. Nederl.-Indië*. 1927. Vol. 67. No. 3. pp. 406-415. With 2 figs. on 1 plate. [Chinese Hosp. of the G.M.B., Tandjong-Pandan.]

A Chinese who had suffered about 2 years from a peculiar affection of the skin. With irregular intervals local necrosis occurred in various places of the skin of abdomen and legs, resulting in an ulcer, serpiginously spreading over a fairly large area. The ulcer then healed in 2-3 weeks. No constitutional or other cause of the affection could be detected. Anatomico-pathological examination showed that there existed a strictly localized arteritis of the terminal arteries of the skin, but the etiology thereof remained obscure.

W. J. Bais.

GAGE (Alfred). **Streptococcal Subcutaneous Necrosis with Gangrene of the Skin.**—*Fifteenth Ann. Rep. Med. Dept. United Fruit Company, Boston, Mass.* 1926. pp. 194-198. [3 refs.]

Four cases are reported of which one proved fatal. Infection by the short-chain haemolytic streptococcus follows trauma, such as crushing injuries or contusions rather than incised wounds and spreads rapidly. The condition is considered to be a definite clinical entity. Treatment consists in early multiple radical incisions, elevation of the flaps and packing with 2 per cent. mercurochrome or 4 per cent. boric acid solutions, preferably hot.

W. J. O.

GROMIER (E.). Cas de tumeurs fibreuses chéloïdiennes généralisées. [**Case of Generalized Keloid.**]—*Bull. Soc. Path. Exot.* 1927. June 8. Vol. 20. No. 6. pp. 553-556. With 2 text figs.

Clinical case report concerning a woman of Lower Guinea, aged 40 years, with raised, hard, well-defined keloidal tumours generalized over the trunk and limbs. Pendulous softer tumours were present on the lobes of the ears. The skin lesions had commenced as pruriginous nodules at the age of 13 years, to proliferate after the establishment of catamenia some 2 years later, accompanied by intense pruritus, nocturnal headaches and severe pains in the bones. There was no apparent cause for the gradual progression of the disease. Her two girls, aged 15 and 18 years respectively, showed similar itching, small nodules following the commencement of menstruation associated in the case of the elder girl with bone pains and nocturnal headaches.

W. J. O.

LEGENDRE (J.). A propos de la dermatite blastomycosique chéloïdienne. [**Concerning Cheloid Blastomycotic Dermatitis.**]—*Bull. Soc. Path. Exot.* 1927. Apr. 13. Vol. 20. No. 4. p. 323.

The author considers that the cheloid blastomycosis described by R. MONTEL & R. PONS (this *Bulletin*, Vol. 24, p. 447) is the same as was observed by him at Tonkin [Deux cas de blastomycose (cutanée) humaine observés au Tonkin. *Bull. méd.-chir. de l'Indo-Chine.* 1911. Sept.], caused by a blastomycete named by him *Blastomyces Tonkini*. In both of his cases large doses of potassium iodide were rapidly curative.

P. Tate.

ISHIKAWA (S.) & NOHIRA (A.). [**Osmidrosis Axillaris.**]—*Acta Dermat.* Kyoto, Japan. 1926. Dec. Vol. 8. p. 775. [Summarized in *Jl. Amer. Med. Assoc.* 1927. Apr. 30. Vol. 88. No. 18. p. 1451.]

The strong smelling sweat, in 19 cases of this affection commencing at puberty, is ascribed to the abnormal development of the apocrine glands which were found present in increased numbers and size.

W. J. O.

UNDULANT AND ABORTUS FEVERS.

BASSETT-SMITH (Percy). **The Relationship of Undulant Fever of Man to Epidemic Abortion of Animals.**—*Jl. State Med.* 1927. Sept. Vol. 35. No. 9. pp. 508–512. [7 refs.]; also in *Jl. Roy. Nav. Med. Serv.* 1927. Oct. Vol. 13. No. 4. pp. 258–263. With 3 maps in text. [7 refs.]

This paper commences with a brief but useful review of the history of undulant fever, special stress being laid on the rôle of the goat as a carrier of infection in many parts of the world and on the fact that, in undulant fever, such complications as orchitis, ovarian symptoms and mastitis are encountered and, of rare occurrence, abortion. HUGHES is quoted as stating that, in his experience, undulant fever does not cause abortion.

Mention is made of the part played by sheep as "carriers," notably in Southern France, and there is a reference to infection from bovine sources both in France and Italy. Here, however, the original infection was probably of caprine origin and due to the true *Brucella melitensis*. The author then considers *Br. abortus*, pointing out that it has a very low power of infection to man, massive doses being required, and referring to American work which has shown that this organism may apparently be the cause of a prolonged fever of undulant type from pigs. He contrasts its culture reactions with those of *Br. melitensis* and indicates that clinical, epidemiological and pathological characters rather than morphological, biochemical and serological results distinguish the diseases produced in man by *Br. melitensis* and *Br. abortus* respectively. These two organisms are closely related, though it has been stated that immunization of a monkey with abortus will protect that animal against melitensis. At the same time, there appears to be little in favour of the theory that *Br. abortus* and *Br. melitensis* are the same organism with its virulence altered by passage through different animals.

In the United States, where much of the recent work on the *Brucella* group has been done, there is probably a true abortus infection of cattle and pigs by the *Br. abortus* of Bang and a secondary infection of cattle from goats originally coming from the Mediterranean area, giving rise to endemic centres in Texas and Western America.

A. Balfour.

SDRODOWSKI (P.). Beobachtungen ueber das Malta-fieber in Aserbeidshan. [**Undulant Fever in Azerbaijan.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1927. July. Vol. 31. No. 7. pp. 301–311. [1 ref.] [State Bact. Inst., Baku, Azerbaijan.]

This very interesting paper is divided into three parts and is full of information.

Epidemiology.—In the autumn of 1922 the author first definitely identified undulant fever in Azerbaijan; it is now known to be widely distributed in the Transcaucasus and probably much further. He states definitely that not only goats but sheep carry the infection to man through milk products, especially cheese, which is almost always made from goat's milk. In Baku the outbreaks appear to depend on the marketing of cheese brought from a distance. Other sources of

infection are cattle, for of 82 examined at the slaughter house at Baku, 4·8 per cent.* gave a positive reaction up to 1 in 300, but the amount of infectious abortion is not known.

Clinical observations.—The symptoms are very varied in character and severity. It is noted that ten of the laboratory staff have become infected in the past 4 years. Affections of the joints and tendons were common, as also severe peripheral neuritis without atrophy of the muscles, periostitis, orchitis and mastitis; one case of jaundice was noted. There were no deaths among the ten, but of the 21 cases of Dr. ISSAKJAN one Armenian died. The duration of the disease was long, up to 3 years. The diagnosis was made by blood culture in 85 per cent., but agglutination results were very definite with a titre up to 1 in 10,000. In chronic cases complement fixation gave the best results.

Experimental investigation.—Guineapigs were found to be very sensitive to the infection. The author divides his work into two series. In 1922–23, when fresh human strains were used, the virulence was very marked and the animals all died in from 2 to 5 months. The striking symptoms were fever, progressive weakness and loss of weight, trophic lesions, paresis and paralysis of the hind quarters. Occasionally with oral infection there was acute septicaemia and death. In the second series in 1924–6, with the use of the same strains, the results were very different. The infection ran a chronic course and the lesions were localized in the spleen, lymphatics, and marrow, without septicaemia. The close similarity of these findings with those of tuberculosis was very marked, as has been pointed out by BURNET. The author describes the organism as a new variety, *M. melitensis Caucasica*.

From August, 1926, there was an epizootic of the infection in the animal house spread accidentally in his 400 guineapigs; this gave his assistant, Dr. BRENN, ample opportunity for many interesting studies; 200 of the chronically affected guineapigs were fully investigated.

With Melitine after BURNET, 94 per cent. were positive.

Wright's agglutination test, 83 per cent. were positive.

Bacteriological (post-mortem), 66·5 per cent. were positive.

Of 48 pregnant animals the foetus was infected in 33 through the placenta. Lymphadenitis, enlarged spleen, and lesions in the liver, articulations, testicles and eyes were common and proportions affected of each are given, but Dr. BRENN is later to give a full report [see also this *Bulletin*, Vol. 24, p. 108]. [The widespread infection among the animals with high degree of foetal infection suggests infectious abortion.]

P. W. Bassett-Smith.

ESPOSITO (Alessandro). Il problema clinico della infezione melitense. [The Clinical Aspect of Undulant Fever.]—*Giorn. di Clin. Med.* 1927. Sept. 20. Vol. 8. No. 13. pp. 527–548. [General Med. Clinic, R. Univ., Pavia.]

The author details six cases of undulant fever said to be the first recorded in the Province of Pavia. There is nothing particular to note in the symptomatology. The diagnosis was made by agglutination in each case, not by blood-culture. The serum in four cases

* Not 48 per cent. as given in Vol. 24, p. 108, of this *Bulletin*.

agglutinated *B. melitensis* and *B. abortus* in equal titre, in the others in a higher dilution with the former.

The remainder of the article is occupied by a review of the various methods which have been proposed to differentiate these two organisms.

H. Harold Scott.

RUDDOCK (John C.). **Undulant Fever.**—*California & Western Med.* 1927. July. Vol. 27. No. 1. pp. 61-64. With 1 chart in text. [19 refs.]

The author describes a case of undulant fever from Los Angeles, in a young mother with a 3-months-old infant which she was suckling. The patient apparently made a good recovery following the use of quinine, but the duration of the illness is not stated. The blood culture was negative, but the serum agglutinated the abortus variety of *Brucella* to a dilution of 1 in 1,280. The interesting point was that the baby remained in good health, though it was nursed by the mother for the first five months, the mother taking three pints of raw cow's milk daily [cf. BURNET & CONSEIL, this *Bulletin*, Vol. 22, p. 513]. He draws the following conclusions:—

(1) All strains of *B. abortus* are not pathogenic to man, but *only those strains that have a Melitensis variation* (italics the reviewer's).

(2) It is of utmost economic importance that the origin of the pathogenic strain be isolated, since it is known that certain milk cows are infected and give abortus (*melitensis*) infected milk.

(3) Any case of prolonged fever, with sweats, large spleen and leucopenia should be suspected as an abortus(?) infection.

[The author quotes AUCHIE incorrectly as describing the alarming spread of abortus infection in France; this should read "spread of undulant fever." The author's views appear to be in favour of there being two causes of infection in these fevers: first, a *melitensis* form secondarily infected into the cow, of true European type, very infective; second, a true abortus, rarely infective and usually inoculated.]

P. W. B-S.

BELYEA (G. N.). *Brucella abortus* **Infection in a Woman.**—*Jl. Amer. Med. Assoc.* 1927. May 7. Vol. 88. No. 19. p. 1482. [3 refs.]

The author reports a case of prolonged fever in a woman treated in the hospital at Bellingham, from one of the large dairy areas on the Pacific Coast where epidemic abortion is very common in cattle. The case was variously diagnosed as typhoid, malaria, and streptococcic septicaemia, but the blood showed a leucopenia, agglutinated *B. abortus* up to 1 in 320 and a small gram-negative coccoid organism was isolated by culture. The symptoms were fever, headache, tachycardia and vaginal haemorrhage. Intravenous injections of mercurochrome caused chills, diarrhoea, vomiting and a rapid rise of temperature to 106° with fall to normal on the third day. A relapse followed. The treatment was repeated with similar results and the patient was finally discharged cured. The method of infection is not stated.

P. W. B-S.

KREUTER (E.). Ueber menschliche Infektion mit *Bacillus Bang*. [**Human Infection with Bang's Bacillus.**]—*Klin. Woch.* 1927. July 16. Vol. 6. No. 29. pp. 1380-1381. [9 refs.] [City Hosp., Nürnberg.]

A veterinary surgeon at Baden, three weeks after operating on a cow which had aborted, was taken ill with what was thought to be influenza. The fever, however, continued with night sweats and pains for three months, followed by two months remission and return of the fever with orchitis and finally good convalescence. The blood cultures were always negative, but the agglutination titre with both *Br. abortus* and *melitensis* was high. The case was treated with a mixed vaccine of the two organisms (strength not stated). After the second injection, which was given during the last fever wave, the temperature fell. After the fifth all the symptoms had disappeared.

[A case of direct and probably heavy infection with *Br. abortus*, giving rise to a prolonged fever of the undulant type.]

P. W. B-S.

DIETEL (Friedrich). *Bacillus abortus*-Bang-Infektionen beim Menschen. [**Human Infection with *B. abortus*.**]—*Muench. Med. Woch.* 1927. Oct. 7. Vol. 74. No. 40. pp. 1704-1705. [2 refs.] [Univ. Skin Clinic, Erlangen.]

A case of a prolonged fever in a veterinary surgeon has been described by KREUTER and the author states that though the literature is very scanty it is fairly certain that such cases are more common than is generally believed. He describes one case of his own, also in a veterinary officer who in 1925, fourteen days after attending a cow with infectious abortion, suffered from haemorrhagic dermatitis of both arms; from one of the blebs a gram-negative micrococcus was isolated but not identified. This was cured in 14 days. Two years later after eating some tainted food he suffered from a prolonged febrile attack with symptoms of colitis and the smell was like that of infectious abortion. After two months a blood sample was sent to be tested and a positive result of 1 in 2,000 to Bang's bacillus was given. It is doubtful whether the 1925 attack was the determining cause; if so, the latent period was very long and possibly the infected food acted as a predisposing cause; evidently the 1925 infection did not cause any immunity reaction.

P. W. B-S.

VEILCHENBLAU. Die Infektion mit dem *Bact. abort. Boum* (Bang). [**Human Infection with *B. abortus*.**]—*Muench. Med. Woch.* 1927. Oct. 7. Vol. 74. No. 40. pp. 1705-1707. [10 refs.]

This paper in association with that of DIETEL is of great interest. The author first notes *how seldom* human cases of abortus disease occur even where epidemic abortion of cattle is very common, viz., lower Austria, Bavaria, etc., but from *time to time* in Bavaria those attending cattle have become infected from the after-birth through injury of the skin. He gives fairly full notes of one case and mentions three others, all in veterinary men.

First case.—Removed two after-births from infected cows and a fortnight after (Aug. 21st) began to feel ill with irregular temperature. On September 9th a blood culture was negative. The case resembled paratyphoid. October 5th, blood showed a marked lymphocytosis, and culture

was again negative. He was treated with tryptoflavin intravenously. The temperature fell to normal, but in November a relapse followed which cleared up under intramuscular injections of iodine and camphor. On December 20th, a sample of blood was sent to the veterinary laboratory in Schleissheim and was found to agglutinate Bang's bacillus to 1 in 6,000. The patient made a slow recovery.

Second case.—Infection from a septic abortion cow, incubation 14 days, followed by 3 months' fever, and in the 4th relapse orchitis. He was treated with a mixed vaccine of abortus and melitensis with good result. The third and fourth cases to be reported later.

Discussing the differential diagnosis of the two diseases he thinks that they are independent. The course of the fever in abortus is less varied than undulant, but in both there is lymphocytosis and leucopenia. It is rare for man to become infected, but these veterinary cases prove that it is possible. With regard to the presence of specific agglutinins in children and adults who have used raw milk from abortus infected herds he states that further research is being carried out.

[The reviewer in London has examined a further series of 500 Wassermann bloods in the laboratory without finding any positive reactions to *Br. abortus* 80.]

P. W. B-S.

ROSS (G. R.) & MARTIN (A. Paton). **The Treatment of Undulant Fever by Mercurochrome-220.** [With Note by Dr. Andrew BALFOUR.]—*Jl. Trop. Med. & Hyg.* 1927. July 1. Vol. 30. No. 13. pp. 165-171. [4 refs.]

The authors quote nine cases treated in the Salisbury hospital, with 1 per cent. of both the English and American preparations of mercurochrome. Amounts up to 25 cc. were given in doses varying from 2 to 15 cc. Three of the nine showed some improvement, but it is said that "no very visible proof has been produced that mercurochrome is likely to be of great value in the treatment of the disease, and it is not advisable to exceed a dose of 10 cc. of a 1 per cent. solution in adults."

Dr. Balfour refers to the case of Dr. BELYEA (above) who claims to have cured a case by giving 30 cc., though excessive reaction with temperature of 106° occurred.

P. W. B-S.

TODD (M. L.). **Two Cases of Malta Fever treated with Mercurochrome.**—*Milit. Surgeon.* 1927. July. Vol. 61. No. 1. pp. 34-35.

Two cases were treated, each with a single dose [amount not stated] The first, a doctor, had high fever with cough. The micrococcus was isolated from his blood. After the injection the cough at once ceased; recovery was rapid and complete. The second also had long fever with cough, loss of weight, and probable blood infection. As the patient was getting worse, 22 cc. of a 1 per cent. of mercurochrome was given, and produced a sharp reaction, but the patient was up the next day. No further information is given except that the author states, "it cured these two men."

[Mercurochrome is a dangerous drug when given in large doses; great care and good records of the cases in which it is used should be taken.]

P. W. B-S.

ROSS (G. R.). **The Agglutination Test in Undulant Fever due to *Brucella abortus*. A Preliminary Note on the Value of the "Abortoscope."**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1927. July 11. Vol. 21. No. 1. pp. 57–62. [8 refs.]

The investigation was made to determine the best agglutination method for the *Brucella* group. The author gives his views founded upon experimental evidence, thus, "In every circumstance the macroscopical method must be preferred" and in this the reviewer cordially agrees. Ross finds that in Southern Rhodesia, at least, simple agglutination cannot differentiate *Br. melitensis* from *Br. abortus*, thus confirming the opinion generally held. It is doubtful if he is correct in stating that the forms of undulant fever there are all due to *Br. abortus*, or that the presence of agglutinins in the serum is the most valuable diagnostic sign (a blood culture being the most important).

He states that of 12 sera of undulant fever cases tested, 8 agglutinated both organisms equally, while in 4 only abortus was agglutinated. *Br. abortus* was isolated by blood culture from 3 of the former and 1 of the latter. The value of these deductions depends on the method used in differentiating abortus from melitensis.

The "Abortoscope" invented by BEVAN is a simple opacity method with a single dilution, one loopful of blood to a tube of emulsion. This is, no doubt, a very useful rough field-work test.

P. W. B-S.

ROBINSON (F. E.). **A Note on the Serological Identity of Rhodesian and American Strains of *Br. abortus* from Human Sources.**—*Jl. Med. Assoc. S. Africa.* 1927. Sept. 10. Vol. 1. No. 17. pp. 442–444. [6 refs.] [Pub. Health Lab., & Pasteur Inst., Salisbury, S. Rhodesia.]

ORPEN and ROSS have in South Africa identified six strains of *Br. abortus* and two of the so-called para-abortus from eight cases of fever. The author therefore made a study of the Rhodesian and American types of *Br. abortus* of both human and bovine origin by agglutination tests. He showed by this method that the American strains of *Br. abortus* are indistinguishable from the Rhodesian types of *Br. abortus* obtained from man; that is to say, a certain type of undulant fever is caused by an organism of similar character in both countries. By absorption test the organism is distinguished from *Br. melitensis* and the para-forms.

P. W. B-S.

VALENTI (Egidio). **Ricerca fisico chimica di costituenti specifici nella compagine bacillare. I. Differenziazione del micrococco di Bruce dal bacillo di Bang. [Physico-Chemical Researches on the Specific Constituents of the Structure of Bacilli. I. Differentiation of the Micrococcus of Bruce from Bang's Bacillus.]**—*Biochem. e Terap. Sperim.* 1927. Mar. 31. Vol. 14. No. 3. pp. 77–115. [32 refs.]

In this paper, to which are appended copious tables setting out the results of numerous serological tests on 55 strains of *B. abortus* and 44 of *B. melitensis*, the author reports finding that after heating to 100° C.

for an hour, no flocculation occurred with the former, but fully one-third with the latter. A second series of tests showed that if the bacilli were heated for $1\frac{1}{2}$ hours and deprived of lipid, it is possible to distinguish the two organisms, provided that the precaution is taken of working in parallel with known strains and with those so treated. This is designated "Thermodelipoidization." He concludes that their differing chemical structure warrants the organisms being regarded as distinct, and that, if the latter test is confirmed, it may be extended to distinguish between bacilli which present closely similar morphological and cultural characters.

H. Harold Scott.

ROSS (G. R.). **The Value of Non-Specific Agglutination in the Differentiation of the Genus *Brucella*.**—*Jl. of Hyg.* 1927. Aug. Vol. 26. No. 3. pp. 279-284. [4 refs.]

The previous work of VERCELLANA & ZANZUCCHI, TRENTINI, FAVILLI on the use of non-specific substances in the differentiation of the melitensis group are described; the results are contradictory. The author has made a series of tests using many strains of *Br. melitensis*, *paramelitensis*, *abortus* and *para-abortus* from both old cultures and some recently isolated in Southern Rhodesia. By absorption tests two groups were determined, one including the majority of the stock melitensis and abortus as well as the Rhodesia strains; the second, the stock paramelitensis plus one so-called abortus, melitensis and two Rhodesian strains. The two groups were tested by thermo-agglutination, peptone agglutination, lactic acid and acid agglutination, and the following summary is made:

"(1) Non-specific agglutination as tested by thermo-agglutination, peptone agglutination, lactic acid agglutination and Michaelis' acid agglutination failed in the primary object of differentiating between *Br. melitensis* and *Br. abortus*.

"(2) Thermo-agglutination was only observed in strains of *Br. paramelitensis*.

"(3) With peptone agglutination no strain gave a positive result.

"(4) The results of lactic acid agglutination and Michaelis' acid agglutination ran practically parallel. No distinction could be observed between *Br. melitensis* and *Br. abortus*. Strains of both of remote origin gave slight agglutination with lactic acid, while recently isolated strains of *Br. abortus* were negative. Very definite agglutination, however, was observed by both methods with *paramelitensis* and *para-abortus* strains, but no differentiation was possible between such strains."

P. W. B-S.

ENRICO (Cesare). Ulteriori osservazioni sulla presenza della agglutinine antimelitense e antibang nel siero di sangue dei ratti vaccinati. [Further Observations on Agglutinins for *B. melitensis* and *B. abortus* in the Serum of Vaccinated Rats.]—*Ann. d'Igiene.* 1927. May. Vol. 37. No. 5. pp. 307-311. [9 refs.]

In 1926 the author recorded the results of some experiments in which he inoculated four rats with *B. abortus*, and found that the serum obtained agglutinated this organism and *B. melitensis* in equal titres. After heating the serum to 65° C. for half an hour, no agglutination

occurred. Four other rats were inoculated with *B. melitensis*: the sera from three of these failed to agglutinate either organism, the fourth contained agglutinins for *B. melitensis* only.

In the present paper record is given of a further series of seven rats. Four of these were inoculated with four different strains of *B. melitensis*, and three with different strains of *B. abortus*, by three subperitoneal injections of 0.25, 0.5 and 1 cc. of an emulsion made of one loopful of culture in 5 cc. saline, killed by heating to 60° C. for half an hour. In one of the first group the serum agglutinated both bacilli in a titre of 1 : 400, and after being heated to 65° C. for half an hour this was reduced to 1 : 100 equally for both. The other six, though agglutinating in high titre (1 : 1,800 in one case) before heating, lost all agglutinins after submission to 65° C.

He concludes that agglutination is not a specific biological reaction but a physico-chemical phenomenon and regards *B. melitensis* and *B. abortus* as but varieties of a single organism modified by the environment of passage through man and animals respectively.

H. Harold Scott.

CERRUTI (Carlo). **On the Relationship of *M. melitensis* and *B. abortus*.**—*Jl. Trop. Med. & Hyg.* 1927. Sept. 15. Vol. 30. No. 18. pp. 230–231. [11 refs.] [Ross Inst., London.]

The author shortly refers to the serological tests carried out in America for differentiating the *Brucella* organisms and notes that the separation of these into groups has not so far placed the *Bacillus* of Bang by itself. His experiments were carried out with the two organisms to eliminate if possible any inhibitory bodies in the immune sera, which were sera derived from rabbits.

The agglutinins were isolated by treating the agglutinated organisms with 1 per cent. caustic soda and then washed with a 10 per cent. solution of saccharose; after 2 hours incubation at 42° C. the solution containing the agglutinins was neutralized and the agglutinating strength determined (OGATA). It is stated that 10 to 20 per cent. of the original agglutinins can be isolated. Three strains of *melitensis* used were from Turin, and three of *abortus* from Budapest, where there is no undulant fever. With the test it was not possible to distinguish the *M. melitensis* of Bruce from the *B. abortus* of Bang, but this does not mean that they are identical, in view of epidemiological facts, the enormous difference in the infectivity of the organisms, and the failure to cause the specific fever by inoculating *Br. abortus* into man (NICOLLE, BURNET & CONSEIL). The author thinks that undulant fever in Piedmont, Italy, is not derived from goats, but is due to an epizootic abortion of cows infected with *melitensis* and not *abortus*, and he states that the name *abortus* should only refer to those organisms which are isolated from animals which have aborted and in an area where infectious abortion is epizootic and human undulant fever is unknown; the term *melitensis* being reserved for *Brucella* organisms isolated from human cases of undulant fever. He again introduces the compound term *Br. melitensis abortus*.

[The reviewer believes with the author that undulant fever in certain districts is conveyed by bovines and that this infection is of a true *melitensis* origin, being spread from the goat to the cows and thus indirectly to man.]

P. W. B-S.

CERRUTI (Carlo F.). Ancora sulla questione della differenziazione del "B. abortus" dal "B. melitense" mediante un saggio di agglutinazione aspecifica. [**On the Differentiation of *B. abortus* from *B. melitensis* by Non-specific Agglutination.**—*Pathologica*. 1927. May 15. Vol. 19. No. 427. pp. 216-218. [1 ref.]

The author has not been able to confirm the findings of VERCELLANA and ZANZUCCHI as regards differentiation by means of non-specific (lactic acid) agglutination [this *Bulletin*, Vol. 24, p. 112]. The differences from his tests proved no greater between the organisms than those between various strains of the same organism. [No protocols are given.]

H. Harold Scott.

ARNOLD (Lloyd) & MILLER (W. E.). *B. melitensis* and *B. abortus* Agglutinins in Dispensary Patients.—*Proc. Soc. Experim. Biol. & Med.* 1927. June. Vol. 24. No. 9. pp. 836-837. [2 refs.] [Univ. Illinois College of Med.]

The blood used was that from ordinary Wassermann tests of out-patients in Chicago. Of 200 sera, using dilutions from 1 in 10 to 1 in 160, fourteen were positive. Three were from pregnant women; dilution 1 in 40. From this it is concluded that 7 per cent. of the average population have a specific response to the group. [Dilutions less than 1 in 30 are of doubtful value (or 1 in 60, Carpenter); this would reduce the positives by 8, viz., 3 per cent.]

P. W. B-S.

LONERO (G.). Sulla setticemia da Bang o da Bruce. [**Infection by *B. abortus* and *B. melitensis*.**—*Riforma Med.* 1927. June 27. Vol. 43. No. 26. pp. 603-605. [14 refs.] [Univ. Bari (Italy).]

The author has repeated the tests of primary agglutination, agglutination after heating to 65°-70° C., and non-specific agglutination, and can determine no valid differences in the behaviour of the organisms. He used four strains of each. He adds his support to the conclusion that the bacilli are mere varieties of a single species, *Brucella melitensis* s.s. and *B. melitensis abortus*, the former being pathogenic for man and animals, the latter, for all practical purposes, pathogenic for animals only.

H. Harold Scott.

ROSS (G. R.). **A Serological Study of Undulant Fever in Southern Rhodesia.**—*Jl. of Hyg.* 1927. Oct. Vol. 26. No. 4. pp. 403-419. [24 refs.] [London Sch. of Hyg. & Trop. Med.]

The author here gives fuller details of his serological study of the organism to which the undulant fever in South Rhodesia is due, and of the relationship of *Br. abortus* to *Br. melitensis*. He worked with 5 strains of *Br. melitensis* (2 from England and 3 from South Africa), 3 strains of *abortus* (2 from England and 1 from Africa), and 1 of *para-melitensis* (England). He was able to divide these (as has been elsewhere reported) into *Br. melitensis*, *Br. abortus* and *Br. para* forms

(*melitensis* and *abortus*) by agglutination absorption tests which are fully detailed. The two latter were quite distinct from the two former groups.

The investigation of 8 strains obtained from undulant fever patients in hospital at Salisbury, in which there was no suspicion of goat's milk infection, gave very interesting results. In 6 the serum reaction definitely placed them in the *Br. abortus* group, but 2 were quite separate from either *melitensis* or *abortus*, being linked up with the *para-melitensis* group, but serologically indistinguishable from an organism obtained from a case of bovine contagious abortion, which had been termed *Br. para-abortus*. The following sentence is of importance:—

"The results indicate that *Br. abortus*, or a mutant type *Br. para-abortus*, is an important factor in the etiology of undulant fever in Southern Rhodesia, and emphasise the necessity for a wider concept of the disease. Certain Rhodesian observers are inclined to the view that, while the *abortus* type of undulant fever produces the same type of symptoms as that due to *Br. melitensis*, these symptoms on the whole are milder than in *melitensis* infection, and that infectivity is not so great. No case of accidental infection of hospital or laboratory personnel has yet been reported."

It is likely that in the group there are two antigenic substances which give rise to very different reactions, possibly a heat stabile and heat labile, causing the coarse and fine flocculation noted by FELIX with other organisms, and here described as group S, including the *melitensis abortus* forms and group R, or mutant *para-melitensis* and *abortus* types.

From this very careful investigation it appears that the form of undulant fever seen in Southern Rhodesia is definitely separated from that of the Mediterranean in that the infection is of bovine origin; the causative organism is generally of the *abortus* type and it tends to show clinical differences. It remains to be proved whether this holds good for other parts of South Africa where goats are more used.

P. W. B-S.

CARPENTER (C. M.) & PARSHALL (C. J.). **A Study of Milk from Cows showing no Agglutinins for *Brucella abortus* in their Blood Serum.**

—*Cornell Veterinarian*. 1927. Apr. Vol. 17. No. 2. pp. 234-235. [5 refs.] [N.Y. State Vet. Coll., Cornell Univ.]

It has been noted by various investigators that the percentage of infected milk from cows showing agglutinins in the blood for *Br. abortus* is high, namely, from 29 to 83 per cent.

The authors carried out converse experiments in which they found that no animals were passing out infected milk which did not give evidence of blood infection at 1 in 60. This conclusion was founded upon the examination of 18 cows. They conclude that if the blood reaction is negative at that dilution there will be no infection of the udder.

[This is not borne out by a study of the table 3 in the report of CARPENTER & BAKER, for out of 16 animals examined 2 gave positive milk and negative blood, and 2 gave positive blood with negative milk.]

P. W. B-S.

CARPENTER (C. M.) & BAKER (D. W.). **A Study of *Brucella abortus* Infection in Milk from Fifty Herds supplying the City of Ithaca, New York.**—*Cornell Veterinarian*. 1927. Apr. Vol. 17. No. 2. pp. 236-247. [12 refs.] [Diagnostic Laboratory, N.Y. State Vet. Coll., Cornell Univ.]

From Ithaca, N.Y., several authors have reported cases of undulant fever in which they have isolated an organism indistinguishable from *Br. abortus*. The milk from 50 herds of cows was tested: one pint of the mixed milk of each herd daily for twenty to thirty days. Both the centrifuged deposit and cream layer were examined by guineapig inoculations and culture methods. The results were: (1) *Br. abortus* was found in the milk of nine herds; (2) the strains of *Br. abortus* from two of the herds supplying milk to cases of undulant fever were markedly virulent to guineapigs, the lesions being similar to those produced by porcine and human strains of *Br. abortus*. The strains from seven other herds were similar to those found in the majority of bovine infections; (3) the cream was more satisfactory for examination than the milk sediment.

P. W. B-S.

GRÄUB (F.). Infektionen beim Menschen durch den Bazillus des infektiösen Abortus Bang. [**Human Infection with Bang's Bacillus.**]—*Schweiz. Arch. f. Tierheilk.* 1927. July. Vol. 69. No. 7. pp. 394-395.

The author quotes cases described by GIRAUD, CARPENTER & MERRIAM and CASTELLI (1926), also HALL & BLACK (1927), but brings forward nothing new.

P. W. B-S.

TROPICAL AND ENDEMIC TYPHUS.

HONE (Frank S.). **Endemic Typhus Fever in Australia.**—*Med. Jl. Australia*. 1927. Aug. 13. 14th Year. Vol. 2. No. 7. pp. 213-226. [14 refs.]

This is a well reasoned paper, by the Chief Quarantine Officer, S. Australia, on the etiological and epidemiological characters of the typhus-like fever prevalent in Australia. The symptoms and diagnostic features are also described. Much of it has already been published by himself and MOORE. He was unable to get the Health authorities to make the disease notifiable, but from a questionnaire which was sent out he obtained reports of 81 cases with 5 deaths. The information established that it was a "place" disease, associated in some way with the prevalence of rats and mice; and that foodstuffs had only an indirect influence in the attraction of these rodents. The rodent at times harbours the infection and the cases tend to occur at certain seasons and localities in little epidemics. Finally it was apparent that the disturbance of material and the rodent population plays an important part in the production of fresh cases. The author gives very full tables of statistics and goes into the historical evidence from other countries. These seem to demonstrate that all the "typhus-like" groups belong to the same family and are in fact the same disease in different parts of the world (spread probably by different ectoparasites). The importance of the character of the *B. proteus* used for the diagnosis, whether indol producing or not, as emphasized by FLETCHER & LESSLAR, is referred to as dividing the cases into two groups [see this *Bulletin*, Vol. 24, p. 123]. MEGAW classified the groups according to the carrier—louse, tick or mite.

P. W. Bassett-Smith.

MOORE (K. R.). **Report on a Series of Cases resembling Typhus Fever occurring in Perth and Fremantle, W.A., from November, 1926, to March, 1927.**—*Health*. Melbourne. 1927. July. Vol. 5. No. 4. pp. 109-116.

In 1916 the author recognized a typhus-like fever in which there was always a positive Weil-Felix reaction. Since that date up to 1927 he has noted 17 fresh cases, 12 in males and 5 in females, with one death. The majority of the cases were connected in some way with foodstuffs, but no two were in the same house and the seasonal prevalence was in the hot months. All gave a positive Weil-Felix reaction and there were apparently two definite endemic centres, at Perth and Fremantle. Wherever there was evidence of the presence of the disease rat infestation was found; these rats showed many ectoparasites, *Xenopsylla cheopis* and *Ctenopsylla musculi* and lice, as *Polyplax spinulosa* and one mite, *Laelaps echidninus*. The rodents probably act as reservoirs of infection. It was thought that the infection had been brought from Adelaide (an infected port) and that the disease had now become widely distributed.

P. W. B-S.

McGILLIVRAY (W. S.). **The Typhus-Like Epidemics of Australia : a Preliminary Communication.**—*Med. Jl. Australia*. 1927. May 21. 14th Year. Vol. 1. No. 21. pp. 743-744.

The title is more pretentious than the paper in which the author describes some bacteriological investigations of blood taken from typhus-like cases. He found motile, gram-negative, late lactose fermenting bacilli.

P. W. B-S.

BANERJEE (R. N.). **Two Cases of Typhus Fever in Kumaon.**—*Indian Med. Gaz.* 1927. May. Vol. 62. No. 5. pp. 264-265. With 2 charts in text.

The endemicity of typhus in the Kumaon hills has been described by MEGAW. The author notes two further cases treated in hospital, in a school girl aged 12 and a male aged 64. In neither was there any history of tick bites or evidence of lice and the disease did not spread. In both cases the rash was typical and the symptoms were definite. The first recovered; the second died on the 13th day. The Weil-Felix reaction does not appear to have been carried out in the first case and was negative in the second.

P. W. B-S.

JAPANESE RIVER FEVER.

FLETCHER (William) & FIELD (J. W.). **The Tsutsugamushi Disease in the Federated Malay States.**—*Bull. Inst. Med. Res. Federated Malay States*. 1927. No. 1. 26 pp. With 4 plates & 4 charts. [15 refs.] [Inst. Med. Research, Kuala Lumpur, F.M.S.]

The authors give a very clear and concise account of the disease known in Japan as tsutsugamushi fever and by different names in other affected localities and spread by more than one kind of mite. Except for one doubtful case reported by DOWDEN in 1925 no case had been recognized in the Malay States up to 1926.

The authors now describe four cases, three from the same plantation, one of which was fatal. There are excellent plates showing the infested land, the primary sore and the rash, with several temperature charts. Finally the relationship of this disease with what is known as tropical typhus is discussed; the authors consider them to be totally distinct.

P. W. Bassett-Smith.

- i. MIYAIRI (Keinosuke) & TAKAHASHI (Sozaburo). [**A Contribution to the Etiological Study of Tsutsugamushi Disease.**]—*Tokyo Iji-Shinshi (Tokyo Med. News)*. 1927. Jan. No. 2504. [Summarized in *Japan Med. World*. 1927. May 15. Vol. 7. No. 5. p. 142.]
- ii. KAWAMURA (Rinya). [**On Miyairi's So-called Tsutsugamushi Protozoa.**]—*Ibid.* No. 2506. [*Japan Med. World*. pp. 142-143.]

i. The authors have found the schizont of a haemogregarine in the enlarged spleen and liver of the field vole. These parasites are believed to be pathogenic as they caused tissue changes (Langhan's cells around the schizonts). They found what were considered to be young schizonts in the organs of human cases in which death occurred within ten days of infection.

ii. An examination of the same material as was supplied to MIYAIRI by the author has shown that the protozoa-like bodies he describes were present not only in the liver and spleen, but also in the lungs. The evidence of their pathogenicity was not confirmed since they were found to be present in the field voles in affected and unaffected areas.

P. W. B-S.

OROYA FEVER AND VERRUGA PERUANA.

HERCELLES (Oswaldo). El germen de la verruga peruana. [**The Organism of Verruga Peruana.**]*—An. Facul. de Med. Lima.* 1927. pp. 231-264. With 5 coloured plates.

The author inoculated the blood of patients suffering from Oroya fever or verruga with fever into peptone broth. At the end of 24 hours he saw by dark-ground illumination minute coccoid bodies, 0.2-0.5 microns, actively motile round a central point. After 48 hours they could be seen by the ordinary microscopical examination, and some of them invaded the red cells and moved within them. In three days a thin pellicle formed in the broth and the cocci were exceedingly numerous, and in another 24 hours cohered as zoogloal masses and lost their motility. Growth was more rapid in glucose-broth, or on glucose-agar with human blood. Cultivation was also made with rabbit's testicle and with haemolysed red cells and in serum with washed red blood-corpuscles, but the best results were obtained with whole blood. The corpuscles are not destroyed by the invasion, but merely serve as carriers to convey the organisms to the bone-marrow where multiplication normally proceeds. By means of an antigen prepared from a culture he obtained positive results by the complement-fixation test.

Haemoculture was positive in febrile cases only; at first he did not obtain growth unless *Bartonella* were found in the peripheral blood, but later in a patient after 15 days' illness, in whose blood these were not present, but who was still suffering with fever, the results were positive.

The author concludes that Oroya fever and Verruga peruana are different manifestations of one and the same disease, and that the *Bartonella bacilliformis* is the causative organism of it.

[It is rather remarkable that the authors should be so successful in growing an infective organism in ordinary media, such as glucose broth, when the STRONG Commission were unable to do so, though they used all kinds of laboratory media, both in verruga and Oroya fever cases.—P. W. B-S.]

H. Harold Scott.

HERCELLES. Conférence sur la verruga péruvienne. [**Discussion on Verruga Peruana.**]*—Bull. Soc. Path. Exot.* 1927. July 13. Vol. 20. No. 7. pp. 559-575.

This is a more detailed account of the author's paper of 1925 [this *Bulletin*, Vol. 24, p. 624 and above], in which he describes the causal agent of Verruga peruana as a minute coccoid organism. This is called by him *Bartonella coccoidi*, it is found in the verruga tissues and cultivated from the blood of fever cases. The coccoid bodies are thought to be stages in

the growth of the bacillary form commonly seen in the red blood corpuscles. With his cultures he was able to prepare an antigen which was useful for complement fixation. He is strongly in agreement with NOGUCHI in regard to the unity of the two conditions.

P. W. Bassett-Smith.

DA CUNHA (Aristides Marques) & MUNIZ (Julio). Pesquisas sobre Verruga peruana experimental. [**Experimental Investigations in Verruga peruana.**].—*Bol. Biol.* S. Paulo. 1927. Sept. 15. No. 9. pp. 135-146. With 11 text figs.

A culture was obtained on Noguchi's medium for leptospira, and the third subculture was used for inoculation intradermally into the supraorbital region and subcutaneously over the right hip of a Macaque. A raised area was seen in the former situation on the tenth day, and continued to increase in size. On the sixteenth day blood was drawn from the saphenous vein and distributed in Noguchi's and in Nöller's media. Direct smears showed no Bartonella bodies. By the twenty-second day there was a nodule the size of a filbert over the site of the hip-inoculation. Material taken from the supraorbital lesion by puncture and also heart-blood were placed in Noguchi's medium.

The animal was killed and portions of the nodules and of the associated glands were fixed for sections, smears also being made. The latter showed some of the polymorphonuclears and large mononuclears (? endothelial cells) to contain bacillary bodies in large numbers, but not the red corpuscles.

The sections revealed cells with bodies, some like Rickettsia, others bacillary, and some resembling Theileria. These are believed to be stages in the development of the infecting organism. Microphotographs are reproduced showing the characters of the bodies seen in smear, section, and culture.

H. Harold Scott.

DENGUE AND UNCLASSIFIED FEVERS.

EDINGTON (Alex. D.). "**Dengue**" as seen in the Recent Epidemic in Durban.—*Jl. Med. Assoc. S. Africa.* 1927. Sept. 10. Vol. 1. No. 17. pp. 446-448.

The author describes a severe epidemic of dengue which occurred in 1927 at Durban, and was carried rather widely by convalescents. There were at least 40,000 cases, but many were probably not recognized. The symptomatology, which is fully described, is much the same as that of epidemic dengue elsewhere, though haematemeses and melaena sometimes simulating gastric ulcer is unusual. The liver was often enlarged, but there was no true jaundice and liver abscess is said to have been a comparatively common sequel. For treatment "diemenal" a colloidal preparation of manganese and iron, is favourably spoken of, but rest and restricted diet are more important.

P. W. Bassett-Smith.

NICOLAS (Ch.). Six cas d'orchites ou ovarite, complications de dengue. [**Six Cases of Orchitis or Ovaritis, complicating Dengue.**]—*Bull. Soc. Path. Exot.* 1927. May 11. Vol. 20. No. 5. pp. 402–403.

The author describes a small epidemic of dengue in New Caledonia affecting about sixty people, forty being adults and all but seven Europeans. During convalescence five cases of orchitis and one of ovaritis were noted; all cleared up without sequelae.

P. W. B-S.

LEGENDRE (J.). Au sujet de la dengue Ouest-Africaine. [**West African Dengue.**]—*Bull. Soc. Path. Exot.* 1927. Apr. 13. Vol. 20. No. 4. pp. 320–322. [4 refs.]

The author again points out that dengue must not be confounded with phlebotomus fever and combats the view of SULDEY that phlebotomus are the carriers of the fever in the Soudan.

P. W. B-S.

TANAKA (Hirosaku) & TAKAGI (Sampei) [**Examination of the Field Boles [? Voles] in the Region in Shizuoka Prefecture where "Akiyami" (Autumnal Fever) prevails endemically. Communication I.**]—*Arch. Igakkuai Zasshi (Jl Aichi Med. Soc.)* 1926. July Vol. 33. No. 4. [Summarized in *Japan Med World.* 1927. Apr. 15. Vol. 7. No. 4. p. 117.]

The author collected 58 specimens of field voles (*Microtus montebelli*) from a region where the fever prevailed endemically; 15 of these were infected with a similar spirochete to that found in Akiyami fever, but further inoculation and cultural experiments were negative. The author considers that the field vole has no importance in the propagation of the disease.

P. W. B-S.

We much regret to announce, as we go to press, the death of Sir Percy Bassett-Smith on December 29th. Sir Percy had served on the staff of the Bureau without a break since the year 1912.

SPRUE.

FAIRLEY (N. Hamilton). **Pernicious Anaemia or Sprue.** [Correspondence.]—*Med. Jl. Australia.* 1927. Apr. 9. 14th Year. Vol. 1. No. 15. pp. 559-560.

Referring to the differential diagnosis between pernicious anaemia and sprue, Fairley finds a colour index above 1 in 56 per cent. of sprue patients. Difficulty in differentiation was only experienced when the alimentary features were atypical. In this group the most reliable clinical features were emaciation or a history of marked loss of weight, the passage of bulky stools, abdominal distension and the complete absence of any neurological signs suggestive of subacute combined degeneration of the cord. Even in latent sprue there is definite limitation on the part of the intestinal mucosa to absorb fat; this becomes obvious directly the fat content of the diet is increased. In 36 consecutive cases throughout all periods of the disease, during and after treatment, it was shown that the fat averaged 47.1 per cent. of the dried faeces. Of this 7 per cent. represented neutral fat, 17.3 per cent. free fatty acid, and 22.8 per cent. was in the form of combined fats. Defective fat absorption is not a feature of pernicious anaemia. The blood in sprue may show the characteristics of an aplastic pernicious anaemia and the bone marrow the corresponding changes. In the long bones gelatinous, greenish marrow deficient in erythroblastic elements is observed. On the other hand, evidence of intravascular haemolysis is limited in sprue; the deposition of haemosiderin in the liver and kidney is also not marked, whilst out of 16, nine cases gave VAN DEN BERGH readings of under 0.5 units and seven exceeded this figure.

The fractional test meal affords most important data from the standpoint of differential diagnosis. In pernicious anaemia the achlorhydria is a true *achylia gastrica*, due to a secretory defect. Analysis of total and free acid curves in a consecutive series of 26 cases of sprue demonstrated that four were hyperchlorhydric, seven normal, and eight hypochlorhydric. In the achlorhydria of sprue, hydrochloric acid is being secreted efficiently, and its absence from the gastric content is dependent on neutralization by alkaline fluids derived from the duodenum. Experience in Bombay was convincing that sprue and pernicious anaemia are distinct clinical entities.

P. H. Manson-Bahr.

BAUMGARTNER (E. A.) & SMITH (Glenn D.). **Pernicious Anemia and Tropical Sprue.**—*Arch. Intern. Med.* 1927. Aug. 15. Vol. 40. No. 2. pp. 203-215. [20 refs.]

This paper concerns itself chiefly with the supposed identity of sprue and pernicious anaemia. The pathology of pernicious anaemia is better understood than the cause, while the yeast *Monilia psilosis* has been claimed as the cause of sprue and has been demonstrated in the stools of both diseases.

Nine of the 15 cases of sprue cited had a colour index of over 1, and five showed an index less than this figure. Four of the patients had a count below two million red cells and five below three millions. Eight cases showed a diminution in the number of leucocytes, and blood platelets; in seven cases there was a definite rise in the number of leucocytes. Three of the 15 cases had achylia.

The authors have confirmed the observation that in sprue there is a low calcium content (about 7·3 mgm. per 100 cc. of blood). In all the cases a history of ulcers in the mouth was obtained. Definite reactions showing tetany have been elicited only in three. In all but one, cultures from faeces were positive for *Monilia*. The blood calcium in 15 cases of pernicious anaemia, taken for comparison, was found within the normal limits. In four, *Monilia* was grown from the faeces by culture. The authors believe that the anaemia in sprue is aplastic.

The achylia in sprue is not as constant as in pernicious anaemia. In three of the most anaemic the presence of free hydrochloric acid was proved, which rules out the possible diagnosis of pernicious anaemia. The loss of weight in sprue is often great. In half the cases the loss was from one-fourth to one-half of the patient's average weight. Neurological changes in sprue cases were indefinite, though in one some signs of degeneration of the posterior columns of the cord were seen. Tetany was never seen in pernicious anaemia. Mental depression, pronounced in sprue, is not found in pernicious anaemia. Clinically patients with sprue have a different history from those with pernicious anaemia. Diarrhoea in sprue is much more marked and constant, loss of physical strength and mental depression more evident. The early morning diarrhoea and frothy stools in sprue are characteristic.

The severe loss of weight in sprue was not met with save in one case of pernicious anaemia. The characteristic appearance of the tongue in pernicious anaemia was not present in cases of sprue. The small liver stressed by some as present in sprue was not specially noticeable in this series. Differentiation of these two diseases is sometimes difficult.

P. H. M-B.

HOLST (J. E.). Ein in Dänemark aufgetretener Fall von Sprue. [**Case of Sprue arising in Denmark.**]—*Acta Med. Scandinavica*. 1927. Vol. 66. No. 1-2. pp. 74-99. [43 refs.]

After reviewing fully the literature of the geographical distribution of sprue and citing instances of its occurrence in countries outside the tropical zone, the author minutely describes the case of a patient recently observed by him.

A woman of 33 years, who was born and bred in Denmark and had never left the land of her birth, had suffered for many years from periodical attacks of diarrhoea and vomiting, and from spastic paraplegia of the lower extremities. From time to time the motions were very light-coloured and for the past three years there had been undue sensitiveness of the tongue with minute buccal aphthae. These symptoms were accompanied by a considerable degree of anaemia of the Addisonian type while more intimate observations showed that the daily amount of faeces passed was greatly in excess of the normal. A moderate pyrexia accompanied the intestinal symptoms and biochemical observations on the nitrogen output indicated a very considerable degree of nitrogen loss. Cramps and tetany were both observed and, in spite of dietetic and other measures, the patient gradually sank. Beyond great emaciation and spontaneous fracture of the ribs, little abnormal was disclosed at autopsy. The contents of the jejunum consisted for the most part of fresh blood.

No features of importance became apparent on microscopical section of the various organs. Analysis of the faeces showed on an average

8.1 per cent. of fat, of which 30-40.2 per cent. were neutral fats, 35.7-52.5 per cent. fatty acids, and 17.5-25.2 per cent. soaps.

The author considers that no question of the correctness of the diagnosis can be entertained and discusses the differentiation of non-tropical sprue from Addisonian anaemia and pancreatitis.

P. H. M-B.

LOW (G. Carmichael) & BENTON (D.). **Sprue in Natives.**—*Jl. Trop. Med. & Hyg.* 1927. Aug. 1. Vol. 30. No. 15. p. 193.

Cases of sprue amongst native races are uncommon. The subject of the present report was a fireman from Calcutta. The tongue presented typical lesions. Together with the fatty, frothy stools there was the corresponding typical anaemia. Chemical analysis of the excreta showed an excess of fatty acids over neutral fats.

P. H. M-B.

BAUMGARTNER (E. A.). **Parathyroid in the Treatment of Tropical Sprue.**—*Amer. Jl. Trop. Med.* 1927. May. Vol. 7. No. 3. pp. 181-191. With 2 text figs. [13 refs.]

In one case of sprue Collip's preparation of parathyroid was given by intramuscular injection in doses of 5 cc. The patient, a lady, showed signs of tetany; both Trousseau's and Chvostek's signs were evident. The blood calcium, which was 5.2 mgm. per 100 cc. of blood, rose definitely and quickly after the first three injections to 8 mgm. The patient made a good recovery. In the second case the parathyroid was given in the form of the dry extract, grain one-tenth thrice daily. No general improvement in the condition of the patient was noted, but a general fall in the ionic calcium was observed in spite of the simultaneous exhibition of calcium lactate. In the third case no alteration in the blood calcium was noted till the patient had been put on a special diet. The dry extract of parathyroid is not so impotent as has been maintained, and it may be dangerous if administered over a long period.

P. H. M-B.

SANDLER (S. A.). Die Behandlung der Sprue mit einem Aufguss der Schalen von Granatäpfeln. [**Treatment of Sprue with Infusion of Rind of the Pomegranate.**]—*Pensée Méd. d'Usbekistane.* Tashkent. 1927. Vol. 1. No. 3-4. German summary p. 227. [In Russian pp. 19-27.]

During the last two years observations have been made upon the therapeutic action of an extract of pomegranate rind. The therapeutic principle appears to be an acid which is combined with calcium and potassium especially in the rinds of the coarser varieties. A tincture of the rind was dispensed in strengths from 75-35 per cent. according to the severity of the illness and appeared to have a definite therapeutic effect. The reaction of the stool was altered on the third day and a definite change in the consistency was noted from the fourth to the eighth day. With an improvement in the blood condition and an increase in the body weight the patients were able to leave the Clinic in six weeks.

P. H. M-B.

Low (G. Carmichael) & COOKE (W. E.). **Blood Transfusion in Sprue.**—*Lancet*. 1927. Nov. 5. pp. 960-961. [1 ref.]

In the later stages of sprue a blood picture very like that of pernicious anaemia often develops and is very dangerous and often fatal. Whole blood transfusions have been used for some time in pernicious anaemia, and one of the patients whose case is to be described was transfused before the authors saw him. Notes of three cases, all European men, are given :—

Case 1. aet. 58. Sprue began in 1917. In 1923 patient was admitted to a hospital in England with red cells 600,000 and haemoglobin 22 per cent. Three whole blood transfusions were done in 27 days, and 4 months later the count was r.c. 1,460,000 and hg. 56 per cent. April, 1924, admitted to Hospital for Tropical Diseases very ill and wasted, with r.c. 2,440,000 and hg. 65 per cent., and after "usual line of treatment" left much improved in August (r.c. 4,160,000 and hg. 80 per cent.). In the next two years two short periods of treatment. July, 1926, re-admitted, and, other methods failing, on August 6th he was transfused (r.c. 2,300,000 and hg. 65 per cent.).* 700 cc. were introduced. September 7th, r.c. 4,200,000 and hg. 80 per cent.; discharged in following week. He had kept well up to September, 1927.

Case 2. An old sprue case dating from 1920. December, 1922, admitted to Hospital for Tropical Diseases and again on five other occasions September, 1926, while in Scotland, rapid relapse; re-admitted on October 2nd unconscious, with r.c. 940,000 and hg. 20 per cent. Glucose saline solution was introduced by vein, and since no improvement followed, 730 cc. of citrated blood, which rapidly restored him to consciousness. He steadily improved, and on October 10th r.c. 2,130,000 and hg. 50 per cent. On February 10th, 1927, r.c. 5,240,000 and hg. 95 per cent. At the time of writing, no relapse.

Case 3. Symptoms of sprue began in 1925, and possibly in 1920. Admitted July 5th, 1927, wasted and anaemic; typical picture of severe sprue. r.c. 2,540,000, hg. 65 per cent., weight 7 st. 3 lb. July 12th, citrated blood transfused, but symptoms of haemolysis and anaphylaxis appeared at once and needle was withdrawn when only 5 cc. had been given. After the passage of severe symptoms he began steadily to improve; 41 days later r.c. 4,460,000 and hg. 85 per cent.; 10 lb. weight gained.

The authors conclude that blood transfusion has now been established as a most important method of treatment in sprue. It would appear from Case 3 that the amount of blood given is not the important factor. The blood injected appears to stimulate the blood-forming tissues of the body, possibly as proteins do in protein shock treatment. A slight rigor and pyrexia frequently follow transfusion.

The paper concludes with some remarks on the use of liver extracts in the form of liver soups, which were extensively used by MANSON, and on Batavia powder, the old Peter Sys's cure, which is prepared from lime.

A. G. B.

* Dr. MANSON-BAHR informs us that for several years he has injected human blood intramuscularly in sprue anaemia and that a case under his care in the Hospital for Tropical Diseases was transfused intravenously by him for sprue anaemia on March 24th, 1926, prior to the cases described in the paper under review. A paper on this and four cases of a similar nature has been contributed for the meeting of the Far Eastern Association of Tropical Medicine on December 5th, 1927, in Calcutta.

KALA AZAR.

CLARK (Francis). **Kala-Azar.**—*Caduceus Jl. Hongkong Univ.* 1927. Mar. Vol. 6. No. 1. pp. 25-29.

Since his arrival in Weihaiwei in December, 1924, the author has encountered many cases of kala azar as stated in his report for 1925. During this year 100 cases were seen at the Civil Hospital while in 1926 a further 71 cases presented themselves. The leased territory of Weihaiwei consists of a 72 mile belt of coast line 10 miles in width and the island of Liu-Kung. The area is 254 square miles and the population 154,416. The cases came from practically all parts of the colony. Of 85 treated cases the youngest was 6 years of age and the oldest 55.

C. M. Wenyon.

SAVAGE (P.). **Kala-Azar in the Simla Hills.**—*Indian Med. Gaz.* 1927. July. Vol. 62. No. 7. pp. 382-384.

Two cases are described, both of which appeared to be kala azar though parasites were demonstrated in one only. Their interest lies in the fact that all the evidence points to the disease having been contracted at Sanawar at a height of 5,760 feet in the Simla Hills. The only sandfly identified in the locality is *Phlebotomus major* which may be suspected as a carrier of the disease.

C. M. W.

MARTÍNEZ GARCÍA (P.). Consideraciones sobre el diagnóstico clínico del kala-azar infantil. [**Clinical Diagnosis of Infantile Kala Azar.**]—*Rev. Méd. de Barcelona.* 1927. Aug. Year 4. Vol. 8. No. 44. pp. 172-181. With 8 text figs. [4 refs.]

The paper is a continuation of a discussion which has been taking place in Spain as to the possibility of accurate diagnosis of infantile kala azar on clinical grounds alone. The author describes four cases which clinically appeared to be kala azar. Spleen puncture revealed leishmania in two of the cases and not in the others which proved to be some other disease.

C. M. W.

LA ROSA. [Sulla leishmaniosi interna infantile in Catania dall'anno 1909 al 1926.] [**Infantile Kala Azar in Catania, 1909-1926.**]—*Riv. Sanitaria Siciliana.* 1927. June 25. [Summarized in *Ann. di Med. Nav. e Colon.* 1927. July-Aug. Year 23. Vol. 2. No. 1-2. pp. 115-117.]

Observations on infantile kala azar in Catania (see this *Bulletin*, Vol. 24, p. 131) disclose the fact that it is responsible for a mortality of 1.66 per 10,000 inhabitants and for 87 of every 10,000 deaths. The mortality is highest in spring and summer and decreases in the autumn and winter. The heaviest mortality occurs amongst children up to three years of age. The disease attacks by preference the children of the poor, and occurs in endemic form in all the cities and towns.

C. M. W.

BOLETIN DEL INSTITUTO DE CLÍNICA QUIRÚRGICA. Buenos Aires. 1927. Vol. 3. Nos. 21-25. pp. 393-469.—**VI. Leishmaniosis.** [Also issued as *3a Reunión, Soc. Argentina Patol. Regional del Norte, Tucumán, Julio, 7, 8 y 10, 1927.* pp. 285-361.]

Section VI of these Proceedings covers 77 pages and deals chiefly with cutaneous leishmaniasis as observed in S. America. BERNASCONI describes a method of preparing solutions of tartar emetic which is a modification of that of CHAVEZ who sterilized the drug with chloroform and used it in 5 per cent. solution. His method is as follows. Twenty gm. of the drug freed from coarse particles is placed in a sterilized wide-mouthed, stoppered bottle with 10 cc. of chloroform. It is left 48 hours during which it is gently agitated from time to time. The drug is then dissolved in 375 cc. of distilled water to which is added 25 cc. of a 10 per cent. solution of citrate of soda. Of this solution a dose of 1 cc., increased in some cases to 4 cc., can be given without untoward symptoms. The same author in conjunction with SORO describes a case of oriental sore in a woman who had recently come to the Argentine from Syria; BORDAS reviews at length the present position of knowledge of leptomonas of plants; PUENTE describes the clinical appearances of cutaneous leishmaniasis, illustrating his remarks by a series of photographs; ESCOMEL emphasizes the differences between oriental sore and the American leishmaniasis and under the latter heading distinguishes uta and espundia; DUSSELDORP records a case of cutaneous leishmaniasis with ocular complications in the form of small nodules on the lids and conjunctivae; unfortunately the diagnosis was purely clinical no leishmania being discovered in any of the lesions. VEIGA records a case of cutaneous leishmaniasis cured by injections of antimosan; MAZZA gives another instance of cutaneous leishmaniasis in a dog and adds the interesting discovery of a similar infection in a horse which had a sore below the inner corner of the left eye. Leishmania were found in smears made from the lesion; ARGANARAZ describes a case of muco-cutaneous leishmaniasis which was cured by intramuscular injections of sulfarsenol.

The various articles contain very little new information apart from that of the infection of the horse noted in MAZZA's paper.

C. M. W.

SHORTT (H. E.). **The Incubation Period of Kala-Azar.**—*Indian Med. Gaz.* 1927. Sept. Vol. 62. No. 9. pp. 507-508.

A young man 22 years of age who had lived all his life in Shillong, a non-endemic area, left for Gauhati, a highly endemic area, in October, 1922. He remained at Gauhati for a week, after which he returned to Shillong. In June, 1923, a similar visit was paid to Dibrugarh, an area of low endemicity, the journey to and fro being by mail train. Two or three weeks after his return to Shillong from Dibrugarh he was attacked by fever, which lasted without intermission for about a week. After an interval of two or three days the fever returned and continued intermittently for nearly a year. There was emaciation, weakness and enlargement of the spleen. In June, 1924, the condition was diagnosed by spleen puncture as kala azar. As regards the incubation period, there are thus two possibilities. It was either 9 to 10 months or 2 to 4 weeks. In view of the low endemicity of kala azar at Dibrugarh it is

concluded that infection took place at Gauhati. This is in accord with the general experience of kala azar though it is rarely possible to find the essential details so clearly cut and definite.

C. M. W.

NAPIER (L. Everard) & HALDER (K. C.). **The Cure Rate in Kala-Azar.**—*Indian Jl. Med. Res.* 1927. July. Vol. 15. No. 1. pp. 187-196. With 2 text figs. [3 refs.]

The statement is often made that antimony treatment of kala azar has converted a 95 per cent. death-rate into a 95 per cent. cure rate. The authors state that the figure is too high in each application, for even amongst cases in which the disease is well established the natural cure rate is probably not less than 10 per cent. In order to obtain information as to the cure rate amongst treated cases 700 cards were dispatched in 1926 to patients who ceased to attend the kala azar out-patient department of the School of Tropical Medicine in Calcutta in 1924. Of these 174 were returned with satisfactory replies giving the information that 101 were in a good state of health, 36 had had fever and further treatment and 37 had died. The routine treatment consisted of injections of a 2 per cent. solution of sodium antimony tartrate twice weekly, the dose being increased gradually from 1 cc. to 5 cc. or to the limit of the patient's tolerance. An examination and analysis of the records which had been kept of the 174 patients shows that even if treatment stops at an early stage in the course of injections there is a reasonable chance of cure, that a total relative dose of 3 gm. per 100 lbs. of body weight (about 30 injections in an average adult) will effect an 80 per cent. cure rate and that prolongation of treatment beyond this point will only produce a slight increase in the cure rate.

C. M. W.

NAPIER (L. Everard). **The Pentavalent Compounds of Antimony in the Treatment of Kala-Azar. II. No. 693 (Von Heyden); an Analysis of the Results of the Treatment in the First 61 Cases.**—*Indian Jl. Med. Res.* 1927. July. Vol. 15. No. 1. pp. 181-186. [1 ref.]

The compound is an amine salt of para-amino-phenyl-stibinic acid. It is in the form of a light brown powder and contains about 40 per cent. of metallic antimony. It is easily soluble in distilled water and if kept sealed in the ampoules as supplied it does not change throughout the year in Calcutta. The toxicity of the drug as tested in mice is very low, the minimum lethal dose being more than 10 times as great as that of sodium antimony tartrate.

In the treatment of kala azar in adults an initial dose of 0.1 gm. was followed by a dose of 0.2 gm. and subsequent doses of 0.3 gm. The majority of the 61 cases referred to in this paper received 10 to 11 injections. The results of treatment were that 58 were discharged cured, 2 failed to respond to treatment and 1 did not complete the course. The drug is of considerable value in the treatment of kala azar and is well tolerated by the patients in comparatively large doses. With the exception of vomiting there are no disagreeable symptoms associated with its administration. A course of 10 injections totalling 2.7 gm. of the compound should produce a cure rate of at least 93.33 per cent.

C. M. W.

Low (G. Carmichael). **A Series of Kala-Azar Cases treated by Antimony Derivatives.**—*Jl. State Med.* 1927. Oct. Vol. 35. No. 10. pp. 591-594.

The paper describes the treatment of six cases of kala-azar in London with either stibosan (von Heyden 471) or neostam (stibamine glucoside of Burroughs Wellcome & Co.). Three of the cases were treated throughout with neostam and two with this drug after recurrence of symptoms following injections of stibosan. One of the patients, a child (see this *Bulletin*, Vol. 24, p. 632), was treated with intramuscular injections of stibosan. No bad results followed this line of treatment and as in the other five cases, a cure was obtained. The dosage of the intramuscular injections was 0.025 gm. increasing to 0.075 gm. Injections were made every third day, a total of 2 gm. being given.

C. M. W.

SMYLY (H. Jocelyn). **The Administration of Tartar Emetic by Various Routes.**—*Ann. Trop. Med. & Parasit.* 1927. July 22. Vol. 21. No. 2. pp. 171-178. [16 refs.] [Peking Union Med. Coll.]

The experiments were designed to discover the best route for the administration of tartar emetic to infants in whom intravenous injections were found to be impossible. Rectal injections were given in three cases but failed owing to the antimony being absorbed in insufficient quantities. After preliminary experiments on rabbits intramuscular injections were tried in one case. The injection was always followed by pain, usually slight but lasting for some hours: sometimes it was severe and on one occasion lasted for seven days and was accompanied by tenderness, swelling and superficial oedema. After a trial on rabbits the intraperitoneal route was adopted in one case, which had been treated by 7 injections into various veins; further intravenous treatment was found to be impossible in the child which was 6 months old. Two injections were given intraperitoneally after which the patient was discharged to the out-patient department where the intraperitoneal treatment was continued thrice weekly during the course of about one month. The total amount of drug given was 264 mgm. (67 mgm. intravenously during first 15 days of treatment). The child was in good health over 2 years later. The injections were made in the middle line of the abdomen just below the umbilicus, the skin being anaesthetized with novocaine. The solution is prepared by adding a requisite quantity of a 2 per cent. solution of chemically pure sodium antimonyl tartrate to 60 cc. of saline in a large syringe. This gave a dose of 12 mgm. in 0.02 per cent. solution. There appeared to be little irritation, for the child generally stopped crying during the injection. It is not claimed that the intraperitoneal injection is preferable to the intravenous but is to be recommended when intravenous therapy is impracticable.

C. M. W.

CHATTERJEE (R. P.). **Arrhythmia of the Heart after Antimony Injection in a Kala-Azar Patient.**—*Med. Rev. of Reviews.* Calcutta. 1927. Apr. Vol. 2. No. 4. pp. 171-172.

The patient was a Hindu boy of 12 years of age who was given three injections of urea stibamine. When seen a few days after the third injection it was noted that the pulse was 36 though the heart was normal,

except that it dropped every third or fourth beat. The antimony was stopped for a week and two injections of atropine 1-100 grain were given. The arrhythmia disappeared completely, but returned the day after a further injection of 0.05 gram of urea stibamine. No atropine was given this time, the heart returning to normal more slowly.

C. M. W.

YOUNG (Charles W.) & HERTIG (Marshall). **Kala Azar Transmission Experiments with Chinese Sandflies (*Phlebotomus*).**—*Proc. Soc. Experim. Biol. & Med.* 1927. June. Vol. 24. No. 9. pp. 823-825. [5 refs.] [Peking Union Med. College.]

Feeding sandflies on infected hamsters showed that *Phlebotomus major* var. *chinensis* was more readily infected with *Leishmania donovani* than *P. sergenti*. By allowing the flies to feed artificially on emulsions of the spleen of infected hamsters the percentage of infections in both flies was increased while *P. perturbans*, which has never been fed on mammals, was also infected. *P. major* is very susceptible to leishmania infection after natural feeds (195 positive out of 348) and artificial feeds (131 positive out of 157). *P. sergenti* is less susceptible after natural feeds (16 positive out of 661) and after artificial feeds (169 out of 349). In *P. sergenti* there is a tendency for the infection to die out after the 5th or 6th day, whereas it tends to persist in *P. major*. Of the two sandflies, *P. major* refeeds with reluctance while *P. sergenti* does so readily.

Feeding infected or potentially infected sandflies on healthy hamsters failed to transmit the infection. In all, 413 hamsters were exposed to infection by these flies, and in no case had infection taken place during an observation of six months. Of 180 hamsters inoculated intraperitoneally with positive sandflies 41 developed visceral infections with leishmania. Five hamsters were inoculated by scarification with two *P. major* females containing flagellates but no infection resulted. A total of 904 females and 89 males of *P. sergenti* from a kala azar region were examined by smears or by inoculation into hamsters or by both methods but no evidence of leishmania infection was obtained. About 200 other sandflies (*P. major* and *P. sergenti*) were negative for flagellates. A large proportion of *P. perturbans* which feeds readily on toads, were heavily infected with a crithidiform flagellate. No infection occurred after inoculating 32 hamsters intraperitoneally with 124 wild *P. perturbans*.

C. M. W.

HINDLE (Edward) & PATTON (W. S.). **Transmission Experiments with Chinese Kala Azar.**—*Proc. Roy. Soc.* 1927. Aug. 2. Ser. B. Vol. 102. No. B. 713. pp. 63-71. [4 refs.] [Members Kala Azar Commission of the Royal Society.]

With sandflies which had fed on hamsters, experimentally infected with leishmania and showing parasites in the peripheral blood, attempts were made to transmit the infection to healthy hamsters. Both *Phlebotomus major* var. *chinensis* and *P. sergenti* were employed. The transmission was attempted in four ways, viz., by allowing the flies to feed on the hamsters, by rubbing the flagellates from the flies into the excoriated skin, by introducing intact or crushed sandflies to the mouth, by inoculating the flagellates intraperitoneally. Hamsters exposed to infection were kept under observation for about six months

after which they were killed and examined by the smear and culture methods. Of 46 hamsters which were inoculated intraperitoneally with the gut contents of *P. sergenti* which had fed once (two to seven days previously) on an infected animal four became infected. All the other experiments were negative. It is noted that considering the small proportion of animals infected by the inoculation of the whole gut contents of several sandflies containing flagellates it is not surprising that up to the present feeding experiments should have given negative results. Even when fairly large doses of culture forms are used the subcutaneous injection is only about one-tenth as effective as the intraperitoneal and when the dose is decreased, as must be the case when the inoculation is effected by the bite of the sandfly, the chances of infecting the animals by this method would be still further reduced. It should be remembered, however, that when present in nature sandflies are often very numerous and a person may be bitten by a hundred or more in a single night.

C. M. W.

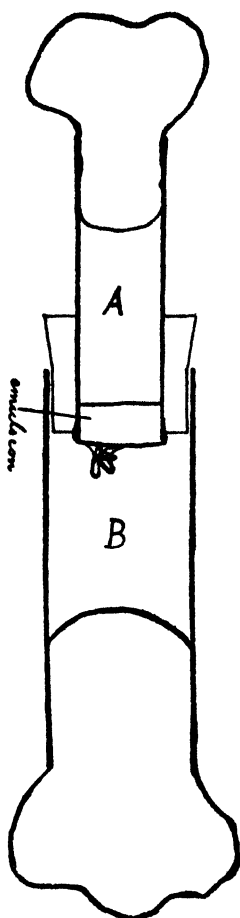
ADLER (S.) & THEODOR (O.). **The Behaviour of Cultures of Leishmania sp. in *Phlebotomus papatasi*.**—*Ann. Trop. Med. & Parasit.* 1927. July 22. Vol. 21. No. 2. pp. 111–134. With 3 text figs. & 9 figs. on 2 plates. [6 refs.] [Hebrew Univ., Jerusalem.]

As noted previously (this *Bulletin*, Vol. 24, p. 645) the authors have shown that *Phlebotomus papatasi* may be infected with leishmania by feeding them on cultures of the organism. In the present paper further details of the experiments are given.

The method of feeding sandflies on cultures is shown in the diagram. A glass tube A, closed at one end by dried, shaved rabbit-skin is fitted through a stopper into a wide tube B. Ether is added to both tubes which are then plugged with cotton wool. When the ether has completely evaporated, the apparatus is sufficiently sterile for use. Emulsion of flagellates is placed in tube A and the sandflies in tube B. The flies feed best on the second day after birth at a temperature of 27° to 30° C. The emulsion of flagellates is prepared by mixing one volume of culture with 10 volumes of saline solution. The mixture is centrifuged and the supernatant fluid removed. This is repeated three times after which the flagellates are counted in a haemocytometer. Inactivated rabbit serum, defibrinated rabbit blood heated at 56° C. for half-an-hour, or inactivated immune serum coloured with a trace of defibrinated blood (in order to make the fed flies recognizable) is added to make concentrations of 200,000, 100,000 or 50,000 parasites per cc. On an average the feed of *P. papatasi* consists of 0.1 cc. If tube A is contaminated with bacteria the flagellates ingested are destroyed in 12 to 16 hours. Of 75 sandflies which fed on cultures of *L. tropica* 34 (45.3 per cent.) were positive. The destruction of *L. tropica* in the sandfly may be fairly rapid for they may have disappeared in 12 hours. Hence the question of a natural immunity of certain flies is raised. Of 21 sandflies fed on emulsions of *L. tropica* in inactivated serum of patients with experimental leishmaniasis, 29 per cent. were infected. Of 6 which fed on emulsions in immune rabbit serum, only one became infected. In 39 out of 56 positive sandflies, the parasites behaved in exactly the same manner as when taken up from an oriental sore and the flagellates which developed were chiefly long forms, many of them having the large nucleus which caused a bulging of the body.

The course of development of *L. tropica* in cultures was changed in the sandfly and moulded into the type assumed by *L. tropica* ingested by the fly from the sore.

Seven experiments on human volunteers were made to test the virulence of cultural forms of *L. tropica*. All these gave negative results so that it can be concluded that the pathogenicity of *L. tropica* for



Apparatus for feeding sandflies on culture. Three-quarters of natural size.

[Reproduced from the *Annals of Tropical Medicine and Parasitology*.]

man is greatly diminished in direct cultures and in first generation sub-cultures which were the cultures used. Two volunteers were inoculated with flagellates from sandflies infected from cultures. In one an infection occurred. This suggests that the virulence is increased by passage through the fly.

With a strain of *L. brasiliensis*, two strains of *L. infantum* and strains of *L. tropica* experiments were made as to the effect of immune sera on the character of the growth in culture tubes. It has previously been shown that with its own immune serum a strain of leishmania gives a

growth in agglutinated masses. It was thought that this test would serve as a reliable guide to species. In the series of experiments now described there was considerable irregularity, for an *L. tropica* immune serum agglutinated a strain of *L. infantum* and vice versa. Further work is thus necessary to perfect the method of serological diagnosis. It is noted that Napier's formaldehyde test was negative with the serum of immunized rabbits.

Of 33 sandflies fed on rich emulsion of *L. brasiliensis* 21 (64 per cent.) were infected. The infection was limited, however, to the stomach. In two cases where the infection was very heavy, flagellates were found in the lowest part of the cardia, but none in the neighbourhood of the valve, while none were attached to the epithelium. Of 16 sandflies fed on emulsion of *L. brasiliensis* in immune serum, none became infected. As in the case of *L. tropica* in the fly, the flagellates in positive flies were chiefly of the long type, the round forms seen in cultures being present in small numbers only. The volunteer who had recovered from an *L. tropica* infection was inoculated with *L. brasiliensis* from a sandfly, but no infection occurred.

A strain of *L. infantum* was found to behave in the sandfly in a manner very similar to that of *L. brasiliensis*. Of 73 flies fed only 23 (31 per cent.) became infected, the infection being limited to the stomach.

The authors, as a result of their experiments, express it as their opinion that any *Phlebotomus* sp. in which flagellates of a *Leishmania* sp. are found attached to the epithelium of the cardia, particularly in the neighbourhood of the oesophageal valve, and in which free flagellates ascend the pharynx and buccal cavity, is capable of transmitting that particular species of *Leishmania*. For this reason they state that they accept the conclusion that *P. argentipes* is the vector of kala azar, in spite of the absence of transmission experiments, just as they would accept the finding of sporozoites in the salivary glands of an *Anopheles* sp. as proof that it is a vector of malaria. [To the reviewer, however, there appears to be this profound difference—anophelines have been proved experimentally on many occasions to transmit malaria by the natural method of feeding, but, up to the present, no single comparable experiment has been made with sandflies and leishmania. It is not yet known how the sandfly transmits leishmania to man so that as yet it is hardly legitimate to make the comparison.]

Experiments were made with two strains of *L. infantum*, one of which, as noted above, behaved in the sandfly like *L. brasiliensis*. The other strain behaved like *L. tropica*. Of 99 sandflies fed on emulsion of flagellates 95 (96 per cent.) were infected. Of 18 fed on emulsion in inactivated immune serum only 9 were positive; and of these 8 had merely a slight infection. From these experiments it would appear that *P. papatasi* is capable of transmitting one of the *L. infantum* strains and not the other, while rats inoculated with the flagellates from the sandflies did not become infected.

C. M. W.

- . CHOPRA (R. N.), in collaboration with GUPTA (J. C.) & DAVID (J. C.). **A Preliminary Note on the Action of Antimony Compounds on the Blood Serum. A New Serum Test for Kala-Azar.**—*Indian Med. Gaz.* 1927. June. Vol. 62. No. 6. pp. 325-327. [1 ref.]

- ii. NAPIER (L. Everard). **A New Serological Test for Kala-Azar.**—*Ibid.* July. Vol. 62. No. 7. pp. 362-365. [2 refs.] [Calcutta School of Trop. Med.]
- iii. CHOPRA (R. N.), GUPTA (J. C.) & BASU (N. K.). **Further Observations on the Serum Test for Kala-Azar with Organic Antimony Compounds. A Simple Blood Test for Kala-Azar.**—*Ibid.* Aug. Vol. 62. No. 8. pp. 434-437. With 2 figs. on 1 coloured plate. [2 refs.] [Sch. Trop. Med., Calcutta.]

i. The action of antimony derivatives, especially urea compounds, on the serum of kala azar cases, has led to a new serum test. Serum separated from the blood is pipetted into a Dreyer tube. A 4 per cent. solution of the drug is slowly added along the sides of the tube to form a layer on the top of the serum. If the serum is from a case of kala azar, a thick, flocculent precipitate forms at once, while with other sera there is either no precipitate or only a slight one. The advantage of the test over the aldehyde test is the immediate result and the smallness of the quantity of serum required. It is not necessary to have a freshly prepared solution of the drug.

ii. The reaction is best performed by adding 2 drops of a 24-hour-old serum to 2 cc. of a 0.25 per cent. solution of stiburea, agitating and leaving on the laboratory bench for ten minutes. If the serum is that of a kala azar case a heavy, flocculent precipitate will form and be deposited in 10 minutes, leaving a clear, supernatant fluid. It was interesting to note that the intensity of the reaction with the various drugs tested was in direct proportion to their therapeutic efficiency as worked out by the author. The most efficient drug, von Heyden 693, gave the most intense reaction.

iii. Further observations on the serum antimony test for kala azar are here described, while the test is illustrated by a coloured plate of the appearances in the tubes. It is pointed out that NAPIER [see above] corroborated the conclusions arrived at by the authors in their preliminary note, but stated that weaker solutions of the drug were preferable and that in most of his observations the serum had been kept in the cool room for 24 hours before the application of the test. The authors believe that it is advantageous to use stronger solutions (1 to 4 per cent.) and that it is unnecessary to keep the serum for 24 hours in the cool room. The test can be applied quite as effectively to fresh serum. The serum of 70 kala azar cases all gave a strongly positive reaction with the antimony test while only 60 gave a strongly positive aldehyde reaction. The sera of 35 lepers were tested. Of these 33 were negative and 2 doubtfully positive. Of 14 malaria cases 13 were definitely negative and 1 moderately positive. Of sera from 10 other cases, one from a case of acute streptococcal dermatitis, one was positive.

In order to make the test easy of application, the following modification has been devised. One or 2 drops of blood from a pricked finger are allowed to flow into a Dreyer tube in which has been placed about 0.25 cc. of a 2 per cent. solution of potassium oxalate. Mixture is effected by inverting the tube. A little of this mixture is transferred to another tube and a 4 per cent. solution of the antimony compound is added along the sides of the tube by means of a capillary pipette so that it sinks below the blood mixture. A flocculent precipitate forms almost immediately at the junction of the two fluids. In very early cases of kala azar the precipitate may take 10 to 15 minutes, very rarely

1 to 2 hours to appear. This test applied to 138 cases, 54 of which were kala azar, showed that all the kala azar cases and those alone gave a positive reaction.

C. M. W.

RAY (Charubrata). **Globulins in Kala-Azar and Syphilis.**—*Calcutta Med. Jl.* 1927. Sept. Vol. 22. No. 3. pp. 115–124. [8 refs.]

The protein constituents of blood serum are : (1) albumin ; (2) euglobulin ; (3) pseudoglobulin I ; (4) pseudoglobulin II. In kala azar the globulin content of the serum is increased and of the three globulins it is the euglobulin which is increased most. In one case of oriental sore there was no such increase. In syphilis there is likewise a globulin increase due mostly to an increase in pseudoglobulin. It appears that the various tests used for the diagnosis of these diseases depend upon the globulin content of the serum. The view is advanced that the Wassermann reaction may in reality be a precipitation reaction, the precipitate being invisible (except in the Kahn reaction) and only demonstrable on the addition of a haemolytic system. It is also possible that the so-called antibody in syphilitic serum is merely a non-specific globulin.

C. M. W.

QUÉMÉNER (E.). Contribution à l'étude de la "formol-gélification" dans la syphilis et le kala-azar. [**Formol-Gel Test in Syphilis and Kala Azar.**]—*Bull. Soc. Path. Exot.* 1927. July 13. Vol. 20. No. 7. pp. 600–601. [Karikal Hosp., (French) India.]

Attention is called to the simplicity of the formol-gel test for syphilis and kala azar. The rate of separation of the flocculum is in direct proportion to the virulence of the infection. In severe cases there is a positive result in 15 minutes ; half the cases gave a result in 15 to 20 hours ; a feeble reaction occurs in 20 to 28 hours. In syphilis the reaction is negative during the first 25 days of infection, as also in cases undergoing treatment. It is positive in 50 per cent. of secondary and tertiary cases of syphilis and is always positive in kala azar. Nearly all cases giving a positive reaction are benefited by anti-syphilitic treatment so that in spite of the fact that the test may be misleading in that it occurs in other diseases it should not be neglected as a guide to the institution of mercurial or arsenical treatment.

C. M. W.

AURICCHIO (Luigi). Ricerche sierodagnostiche nella leishmaniosi infantile. [**Serodiagnostic Researches in Infantile Leishmaniasis.**]—*Pediatria.* 1927. July 1. Vol. 35. No. 14. pp. 745–750. [13 refs.] [Univ., Naples.]

A series of 24 cases of infantile kala azar in Italy was investigated serologically for the presence of agglutinins in the blood and the complement fixation. Flagellates from a 10 to 12 days' culture of *L. infantum* were suspended in physiological saline solution. To 1 cc. of the suspension was added 0.05 cc. of serum. The mixture was then kept at 37° C. for 24 hours. No evidence of agglutination was observed.

For the complement fixation test an antigen was prepared from cultures, the flagellates from each tube being suspended in 2 cc. of physiological saline solution. The reaction was positive in 20 of the 24 cases.

C. M. W.

HU (C. H.) & CASH (J. R.). **Considerations on the Relationship of the Reticulo-Endothelial System to Kala-Azar.**—*Proc. Soc. Experim. Biol. & Med.* 1927. Mar. Vol. 24. No. 6. pp. 469-472. With 2 text figs. [3 refs.]

Working with hamsters suffering from experimental kala azar, it was shown by supravital staining of the cells obtained by spleen puncture that those which contain the parasites had the staining qualities of reticulo-endothelium.

Injection of indian ink intravenously leads to this substance being taken up by cells of the reticulo-endothelial system. When practised on infected animals it is the parasitized cells which ingest the ink. Reticulo-endothelial cells or clasmatocytes are widely distributed in the skin and subcutaneous tissues of infected hamsters and like those in the spleen and other organs contain the parasites. If indian ink is injected subcutaneously it is absorbed by these cells.

C. M. W.

PITTALUGA (Gustav). Die "Blockierung" des retikulo-endothelialen Systems bei viszeraler Leishmaniose (Kala-Azar). [**The Blocking of the Reticulo-Endothelial System in Kala Azar.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1927. July. Vol. 31. No. 7. pp. 340-345. [Univ. Madrid.]

The author discusses the function of the reticulo-endothelial system in human pathology and draws attention to the fact that in kala azar there is actually a blocking of the system with the parasites. The specific action of antimony in this disease must be brought into relationship with the peculiar susceptibility of the system to metals.

C. M. W.

ACTON (Hugh W.) & NAPIER (L. Everard). **Post-Kala-Azar Dermal Leishmaniasis.**—*Indian Jl. Med. Res.* 1927. July. Vol. 15. No. 1. pp. 97-106. With 21 figs. on 12 plates (3 coloured). [7 refs.] [Calcutta School of Trop. Med. & Hyg.]

Since the autumn of 1925 a number of cases of this affection have been encountered at the out-patient department of the Calcutta School of Tropical Medicine. In this paper are described 44 cases seen during this period. The condition is so characteristic in all its stages that a clinical diagnosis can be made in almost every instance. It is almost certainly a sequel to a generalized infection with *L. donovani*. More than half the patients gave a definite history of kala azar for which they had received treatment, others gave a history of fever of some months duration with enlargement of the spleen, while some gave no history of either fever or kala azar. It would seem that these last can be explained by the existence of a transient and undetected leishmania infection which has cured itself without developing into clinical kala azar. That the skin condition was necessarily preceded by a course of treatment for kala azar is disproved by the fact that

20 of the cases had not been so treated. Of the 24 treated cases 11 had been given sodium antimony tartrate alone, 3 urea stibamine alone and 2 both drugs. In 8 cases the nature of the drug used was not determined.

The skin lesions occur in three distinct types. The first type is that of a depigmented patch which appears usually on the face, neck and exterior surfaces of the forearms, on the inner sides of the thighs and eventually on all parts of the body. When fully developed the patches may be half an inch in diameter. When a history of kala azar and its treatment was given it was noted that the lesions were first observed about a year after completion of the course of treatment. The depigmented patches become raised and eventually develop into nodules giving rise to the second type of lesion. This usually appears about two years after the kala azar treatment. In this stage the disease is frequently mistaken for leprosy. The nodules are soft, yellowish-pink granulomatous growths. They are quite painless and show no tendency to ulceration. In certain rare cases, with a history of about 10 years, a third type of lesion resembling xanthoma develops. As regards the diagnosis leishmania were discovered in 30 of the 44 cases. There is difficulty in finding parasites in the depigmented lesions. In 2 cases a culture of leishmania was obtained from the peripheral blood, which gives a picture of leucocytosis with eosinophilia rather than the leucopenia characteristic of kala azar.

The paper is illustrated by three coloured plates (two showing the character of the depigmented lesions and one the xanthoma-like condition) and a number of photographs giving the appearance of the nodular and other types of lesion.

C. M. W.

BRAHMACHARI (Upendra Nath) & DUTT (Anant Mohan). **Dermal Leishmanoid with Positive Flagellate Culture from the Peripheral Blood.**—*Jl. Trop. Med. & Hyg.* 1927. June 15. Vol. 30. No. 12. pp. 158-159.

The case described is that of a kala azar patient who was incompletely treated with stibosan (von Heyden 471). When seen six weeks later he was evidently still suffering from kala azar as he had a large spleen with fever and leucopenia. In addition he had a well marked nodular eruption over the face, trunk and extremities and pigmented patches over the body. The nodules on the skin showed *Leishmania donovani*, while this parasite was also cultivated from the blood. Treatment with urea stibamine was instituted. The patient was cured of kala azar, but the skin eruption diminished only slowly though bi-weekly intravenous injections of urea stibamine were continued for five months.

C. M. W.

CASH (J. R.) & HU (C. H.). **Kala-Azar : Demonstration of *Leishmania donovani* in the Skin and Subcutaneous Tissue of Patients : Possible Relation to the Transmission of the Disease.**—*Jl. Amer. Med. Assoc.* 1927. Nov. 5. Vol. 89. No. 19. pp. 1576-1577. With 3 text figs. [1 ref.] [Peking Union Med. College, Peking.]

The authors have discovered that in experimentally infected hamsters the clasmotocytes of the skin are tremendously increased in number and contain numerous leishmania. These parasitized cells form a thick

layer of heavily infected tissue covering each animal, though no change can be seen on the surface of the body even after the hair has been removed. It was thought advisable to examine cases of kala azar from this point of view. Skin from a fatal case was available and sections showed great numbers of clasmatoocytes filled with leishmania as in the experimentally infected hamsters. All levels of the skin below the epidermis contain these infected cells. They are collected in large masses about the sweat glands and arterioles and are scattered diffusely throughout the corium, extending even into the papillae just below the epidermis. It is not known from what part of the body the sample of skin came, but the history sheet of the case mentions small brownish, slightly elevated areas on the arms, shoulders and knees. A portion of subcutaneous tissue from another case showed a similar increase of clasmatoocytes which were heavily infected with leishmania.

It is pointed out that the occurrence of such large numbers of leishmania in the skin and subcutaneous tissues reveals the first reasonable source from which the infection may be transmitted from one individual to another. Owing to the perivascular arrangement of the infected cells it is very likely that a blood-sucking insect would become contaminated with the parasites. The discovery also raises the question of the occurrence of parasites in the peripheral blood. In many cases the leishmania may have actually come from the skin. The possibility of diagnosis by skin examinations is also mentioned. [The authors do not refer to the curious skin eruption which occurs in certain kala azar cases in India, and which is the subject of a paper by ACTON reviewed in this number. If skin infection like that described by the authors is of common occurrence in kala azar, then it would be reasonable to suppose that in certain cases visible cutaneous lesions might appear.]

C. M. W.

WEISS (Pedro). Die "Espundia," Beitrag zum Studium dieser Hautleishmaniasis in Perú. [**Espundia, Peruvian Dermal Leishmaniasis.**—*Arch. f. Schiffs- u. Trop.-Hyg.* 1927. July. Vol. 31. No. 7. pp. 311-321. With 7 text figs. [13 refs.]

Cutaneous leishmaniasis in Peru is of two types. The one is a mild disease like oriental sore in that frequently it cures itself. The mucosae may be involved and when this occurs it is the result of contact. The other is a more serious complaint, espundia, which commences as a primary lesion on some exposed part of the skin, extends by involvement of the mucosae and terminates by a more extensive infection of the neighbouring skin. The primary lesion (or lesions, for as many as four may be present) not infrequently commences at some cutaneous wound or abrasion. It develops into an ulcer the nature of which can only be recognized by the discovery of leishmania. Either before, or soon after, or in some cases several years after, the healing of the primary sore the mucosal lesions appear. These develop fairly rapidly and by direct extension lead to involvement of the skin of the face. In two cases the disease had persisted for 8 and 24 years respectively. Pathologically the lesions of espundia are distinguished from other chronic processes such as the syphilitic by three features, viz., a rich plasma cell content, destruction of the lymphatics and blood vessels, and presence of giant cells. As regards treatment the author expresses himself very enthusiastically in favour of tartar emetic in sufficient doses.

C. M. W.

BLANC (Georges) & CAMINOPETROS (J.). Nouvelle enquête sur la répartition du bouton d'Orient en Grèce. Un foyer continental en Laconie-Péloponèse. [**Oriental Sore in the Mainland of Greece.**]—*Ann. Inst. Pasteur*. 1927. Sept. Vol. 41. No. 9. pp. 1002–1021. With 3 figs. (2 maps). [11 refs.]

Though it has been known for many years that oriental sore is endemic in Crete the information as to its occurrence on the mainland of Greece has been less definite. An examination of the Syngros hospital records at Athens led the authors to believe that some of the 60 cases treated there from 1915 to 1926 were instances of infection on the mainland. One case particularly pointed to Neapolis as a centre of infection. A visit to this place and a more extended survey brought to light a number of cases, so that it has been established that in the Department of Laconia oriental sore is endemic and occurs in and around Neapolis, as also in Campos, Cotronas and Laya. The disease has undoubtedly been in existence here for many years.

C. M. W.

i. PONS-LEYCHARD. Chronique du bouton d'Orient en Algérie. Un cas dans l'Oranie du Nord. [**Oriental Sore in Algeria.**]—*Arch. Inst. Pasteur d'Algérie*. 1926. Dec. Vol. 4. No. 4. pp. 573–574.

ii. GUEIDON (E.) & PONS-LEYCHARD (A.). Chronique du bouton d'Orient en Algérie. 3 nouveaux cas (29e, 30e et 31e) hors des régions sahariennes.—*Ibid.* 1927. Mar. Vol. 5. No. 1. pp. 22–24. With 1 plate & 1 map. [4 refs.] [*Pasteur Inst., Algiers.*]

i. A record of a case of oriental sore at Hennaya in northern Algeria, the first to be diagnosed in the department of Oran.

ii. A description of three cases of oriental sore in Algeria outside the Sahara district. Two of these were from the north of the department of Constantine where a number of other cases have occurred and one from the department of Oran where one case (referred to above) has been seen previously.

C. M. W.

OWEN (D. Uvedale). **A Case of Oriental Sore.**—*Ann. Trop. Med. & Parasit.* 1927. July 22. Vol. 21. No. 2. pp. 277–280. With 2 figs. on 1 plate.

A man 26 years of age developed a sore on the elbow in Baghdad in September, 1925. This was followed in December by an eruption on the face. In February, 1926, the condition was diagnosed and a series of 20 to 30 injections of tartar emetic commenced. The treatment ended in May, 1926, with no improvement. On July 5th, 1926, he was seen in Liverpool. The face was covered with nodules ranging from 2 to 30 mm. in diameter. Many were ulcerated while others were subcutaneous. The nose, eyelids and ears were involved, as also the neck. On the chest were 4 nodules, while others occurred on the hands, forearms and elbows. On the forehead alone about 80 separate nodules were counted and several were found on the scalp. In all there were about 250 nodules on the face and forehead. Scrapings from sores on the face and elbow revealed

Leishmania tropica in large numbers. Intravenous injections of von Heyden 471 were commenced on the following day and in doses of 0.3 gm. were continued up to the end of September. In all 24 injections, with a total of 7.2 gm., were given. The patient returned to Baghdad in December, 1926, by which date a great improvement had taken place.

C. M. W.

KARAMCHANDANI (P. V.). **An Analysis of 337 Cases of Oriental Sore treated by Various Methods.**—*Indian Med. Gaz.* 1927. Oct. Vol. 62. No. 10. p. 558.

Of the 337 cases, 300 were treated with intravenous injections of tartar emetic. One of the patients became ill after the third injection and died within 72 hours. The treatment consisted in the injection of 1 per cent. solution every third day commencing with 5 cc. and increasing to 10. The average time required to effect a cure was 18 days. Cases treated by excision or scraping were 20 in number. The average time for cure was 25 days. Ionization was only a partial success in 5 cases, while X-rays were very successful in another 5 cases, but the time required for cure was 6 weeks. Local treatment with potassium permanganate and tartar emetic ointment in two cases was not very satisfactory. In 5 cases very good results were obtained with berberine sulphate, a dose of a quarter of a grain, dissolved in 1.5 cc. of distilled water and sterilized, being injected subcutaneously into the skin in three places near one side of the sore. In a week's time the treatment was repeated on the other side of the sore. The sore is dressed with hypertonic saline solution. The average time of healing was two weeks.

C. M. W.

BEHDJET (Houloussi). Die Behandlung der Orientbeule mit Diathermie. [**Treatment of Oriental Sore by Diathermy.**]—*Dermat. Woch.* 1927. Apr. 30. Vol. 84. No. 18. pp. 619-621.

In a series of cases of oriental sore, the relative value of treatment by diathermy and carbon dioxide snow was tested. It was found that diathermy preceded by the injection of a local anaesthetic (alypin or novocaine) gave the better results.

C. M. W.

JESSNER (Max). Untersuchungen ueber die Wirkung von Leishmania-vaccine bei experimenteller Hautleishmaniose. [**The Action of Leishmania Vaccine in Experimental Dermal Leishmaniasis.**]—*Arch. f. Dermat. u. Syph.* 1927. Apr. 23. Vol. 153. No. 1. pp. 237-247. With 4 text figs.

In this paper are described in detail experiments which have been the subject of a preliminary communication (this *Bulletin*, Vol. 24, p. 647). The method of preparation of the *Leishmania tropica* vaccines for use in the skin reaction and the immunizing of dogs is given, as also the clinical histories of the animals used. The conclusions reached are the same as those mentioned in the earlier paper.

C. M. W.

ADLER (S.) & THEODOR (O.). **The Transmission of *Leishmania tropica* from Artificially Infected Sandflies to Man.**—*Ann. Trop. Med. & Parasit.* 1927. July 22. Vol. 21. No. 2. pp. 89–110. With 2 text figs. & 11 figs. on 3 plates. [4 refs.] [Hebrew Univ., Jerusalem.]

Experiments previously conducted by the authors tended to show that the flagellates which develop in *Phlebotomus papatasi* after the ingestion of *Leishmania tropica* only become infective to man when they have reached a certain maturity in the fly (this *Bulletin*, Vol. 24, p. 142). Further experiments in this direction are now recorded. The flies after feeding on the sore were kept for a varying number of days before dissection and inoculation of flagellates into the skin of volunteers. Nine experiments with *L. tropica* which had developed from 2 to 7 days in the sandfly all gave negative results during an observation period of 5 to 15 months. Of 19 experiments with *L. tropica* which had developed from 8 to 21 days, 6 gave a positive result. From these results it is concluded that *L. tropica* undergoes a biological cycle in the fly and that until the cycle is completed all the forms of *L. tropica* in the fly are non-infective for man. The duration of the cycle is 8 days at a temperature of 19° to 23° C.

Fifty laboratory bred sandflies were fed on one of the lesions resulting from the above inoculations. Of these, two became infected. An original naturally occurring strain of *L. tropica* in the sandfly has thus been passed to a human being, back again to a sandfly, again to a human being and still again to a sandfly (*loc. cit.*, p. 142).

A histological examination of the lesions produced in human beings by inoculation of the naturally occurring flagellates of the sandfly has shown that they are identical with those of true oriental sore.

Employing three volunteers unsuccessful attempts were made to transmit oriental sore by the bites of 92 sandflies (89 which had fed on a lesion and 3 on cultures). Of the total thus fed only 5 were subsequently found infected, and those belonged to the 89 which had fed on a lesion.

In the sandflies, as previously reported, the flagellates confine themselves to the midgut and thence pass to the oesophagus, oesophageal diverticulum and pharynx. They avoid the hind gut. The long forms of the flagellate become the dominant type from the fourth day onwards. They are the last to appear in the sandfly, and since they form the overwhelming majority of the types present when the flagellates are infective it is practically certain that they are the infective forms. Owing to what appears to be a failure of the nucleus to divide this structure becomes large in certain flagellates producing a swelling of the body at the point where the nucleus lies. Such forms are a striking feature after the eighth day.

C. M. W.

PARROT (L.) & DONATIEN (A.). Le parasite du bouton d'Orient chez le phlébotome. Infection naturelle et infection expérimentale de *Phlebotomus papatasi* (Scop.). [Natural and Experimental Infection of *P. papatasi* with *L. tropica*.]—*Arch. Inst. Pasteur d'Algérie*. 1927. Mar. Vol. 5. No. 1. pp. 9–21. With 4 plates (1 coloured) & 1 text fig. [5 refs.] [Pasteur Inst., Algiers.]

The authors point out that during May and June, 1922, they attempted to discover leishmania in *Phlebotomus papatasi* in Biskra by inoculating

tubes of NNN medium with the stomach contents of 206 flies and mice with 864 flies. The experiments were entirely negative. The search was again made during September, 1926 with the result that in a series of 181 flies dissected 1 was found to have a stomach infection of a flagellate which was presumably *Leishmania tropica*. It was also demonstrated that there did not occur at Biskra any other species of *Phlebotomus* which could be mistaken for *P. papatasi*. The only other species were the small *P. minutus* var. *africanus* and the allied and rare *P. fallax*.

Not having available any case of oriental sore on which to feed flies, mice which had been infected in the tail as described in an earlier paper were used (this *Bulletin* Vol. 24, p. 647). The type of lesion produced in these infected mice is illustrated by photographs and a coloured plate. Of 62 *P. papatasi* which fed on such infected mice 17 (25 per cent.) acquired a flagellate infection. In the case of 43 of these flies there was no limit placed on the region of the body on which they could feed and only 6 (14 per cent.) were infected. With 29 of the flies the tail of the mouse alone was exposed to the bites and of these 11 (37 per cent.) were infected. Even here there was the possibility that some of the flies had fed on the healthy part of the tail.

The evolution of the ingested leishmania is very rapid in the fly at 30° C. Even as early as the 16th hour after the feed, well developed flagellates are present. Towards the 36th hour the long forms measuring 16 to 17 microns predominate. Certain forms are very long and narrow, 18 by 1 micron. From the 48th to the 85th hour, with the digestion and disappearance of the blood there is a progressive development of the flagellates towards the long type. As a rule, the infection of the flies was a very heavy one, and was limited entirely to the stomach, especially its anterior part. It was not possible to follow the development beyond the fourth day owing to the death of the flies. Four mice were inoculated in the tail, three with flagellates from 34 to 40 hour flies and one from a 48 hour fly. No infection occurred and it is concluded that the flagellates had not yet reached the infective stage.

C. M. W.

PANJA (Ganapati). **The Production of Oriental Sore in Man by Flagellate Culture of *Leishmania tropica*.**—*Indian Med. Gaz.* 1927. May. Vol. 62. No. 5. p. 250.

On two occasions with an interval of one week 1 cc. of a week-old culture of *Leishmania tropica* was inoculated into the skin of a man who volunteered for the experiment. In about 3 weeks a small nodule had developed at the site of inoculation. This developed in a year into a typical ulcerating sore, in which leishmania were found. A cure was then effected by applications of carbon dioxide snow.

C. M. W.

CHODUKIN (N. I.) & SCHEWTSCHENKO (F. I.). Einige Worte ueber die "Haut-Leishmaniose" der Hunde in Tashkent. [**Dermal Leishmaniasis in Dogs in Tashkent.**]—*Pensée Méd. d' Usbekistane.* Tashkent. 1927. Vol. 1. No. 3-4. German summary p. 235. [In Russian pp. 175-178. 4 refs.]

From a two years' experience in Tashkent, the authors have arrived at the conclusion that cutaneous leishmaniasis of dogs as distinct from

a generalized infection does not exist. All cases of the latter condition show skin lesions, if only an affection of the eyelids, which occurs in 98 per cent. of all the cases. Leishmania were found in the internal organs including the testis. They also occurred in the conjunctiva, in pus from the conjunctival sac and in skin which appeared externally to be healthy.

C. M. W.

TORRADEMÉ. [Vorkommen der Aleppobeule im Distrikt von Tortosa.] **[Occurrence of Oriental Sore in Tortosa District, Spain.]—***Med Ibera*. Vol. 20. No. 461. p. 169. [Summarized in *Arch. f. Schiffs- u. Trop.-Hyg.* 1927. June. Vol. 31. No. 6. p. 297.]

A disease which has been recognized for 50 years in Perello (Tortosa, Spain) and is known locally as "Llunari" has been demonstrated to be cutaneous leishmaniasis by the discovery of the parasite in the lesions. It occurs only in children and responds to injections of von Heyden's stibenyl and 10 per cent. solution of methylene blue.

C. M. W.

ANDREWS (Justin M.). **Report of a Case of Oriental Sore in the United States.**—*Amer. Jl. Trop. Med.* 1927. July. Vol. 7. No. 4. pp. 221-224. [9 refs.] [School of Hyg. & Pub. Health, Johns Hopkins Univ., Baltimore, Md.]

An account of a case of oriental sore in a Turkish student who contracted the disease in Diarbekir, Syria. This is the fifth case of the kind to be diagnosed in the United States.

C. M. W.

FERNÁNDEZ MARTÍNEZ (Fidel). Sobre diagnóstico clínico del kala-azar infantil. **[Clinical Diagnosis of Infantile Kala Azar.]—***Rev. Méd. de Barcelona*. 1927. June. Year 4. Vol. 7. No. 42. pp. 598-603.

A discussion on the clinical diagnosis of kala azar is concluded by the statement that no case should be diagnosed as leishmaniasis without a parasitological proof.

C. M. W.

FERNÁNDEZ MARTÍNEZ (Fidel) & GARCÍA DEL DIESTRO (José). El kala-azar en España. **[Kala Azar in Spain.]—***Semana Méd.* 1927. July 7. Vol. 34. No. 27 (1747). pp. 30-54. [Numerous refs.]

An article of about 30,000 words on the whole subject of kala azar which appears to have been stimulated by the occurrence of the disease in Spain.

C. M. W.

POŻARISKI (Petar F.). Ueber Stibenyl und Stibosan bei Splenomegalia infantum. **[Stibenyl and Stibosan in Infantile Splenomegaly.]—***Arch. f. Schiffs- u. Trop.-Hyg.* 1927. May. Vol. 31. No. 5. pp. 240-241. [3 refs.]

The author describes two cases of infantile splenomegaly in Yugo-Slavia. He assumes that the disease is kala azar for one of the cases treated with antimony derivatives (stibenyl and stibosan) recovered.

C. M. W.

BASU (Charu Chandra). **A Silver Method of Staining *Leishmania donovani* in the Tissues.**—*Indian Med. Gaz.* 1927. May. Vol. 62. No. 5. pp. 253–254. [3 refs.]

When staining kala azar material for reticular tissue by Gorriz's modification of the Bielchowsky-Cajal method it was noted that the leishmania were well stained.

C. M. W.

DOSTROWSKY (A.). [Leishmania of the Skin in Palestine.]—*Harefuah.* Jerusalem. 1927. Apr. Vol. 2. No. 2. pp. 382–389. With 7 figs. [In Hebrew.]

REVIEWS AND NOTICES.

MACGREGOR (Malcolm E.). [Entomologist, Wellcome Field Laboratory, Wisley, Surrey, England; Director, Colonial Office Anti-Malaria Survey of Mauritius (1922-1923), etc.] **Mosquito Surveys. A Handbook for Anti-Malarial and Anti-Mosquito Field Workers.** With Foreword by Sir Ronald Ross, K.C.B., K.C.M.G., F.R.S.—282 pp. With 3 maps & 123 figs. Published for Wellcome Bureau of Scientific Research, 25-28 Endsleigh Gardens, W.C. 1. 1927. London: Baillière, Tindall & Cox, 7 & 8 Henrietta Street, Covent Garden. [15s.]

Half of the descriptive text of this book is taken up with a full—and a very good—account of the mosquitoes of Mauritius and Rodriguez. To those who may object that for a book so widely intended as its sub-title indicates this magnified intervention of the mosquito-fauna of two small islands of the Indian Ocean is a case of *πλέον ἡμῖν πάντος*, the author would probably reply that it furnishes a good example of the recorded results of a useful entomological survey—as undoubtedly it is.

The other half of the descriptive text is—if the mere ten pages given to antimalaria and antimosquito surveys and mosquito control be deducted—equally divided between (1) the natural characters, natural history, and classification of mosquitoes, and (2) the manipulation of mosquitoes in the laboratory and in the field, and their management in captivity.

In the natural history section is to be found a good account of the anatomy of a mosquito, external and internal, and of the life-history and post-embryonic development of the insect. As insignificant blemishes in a fair field, we notice that insects are here exalted to the rank of a phylum, instead of being kept in their proper station as one of the five classes of a phylum; that the singular form "pleuron" is ill-matched with the plural form "pleurac"; and that the venerable word "trochanter" appears in a dandified disguise as "trochantanta."

The section dealing with the practical work of the laboratory, with the rearing and husbandry of mosquitoes, and with the collection of larvae, is excellent, being full of ingenious contrivance and invention for the work bench and the vivarium. Among minor, but not unimportant, points one cannot here approve of water as an alternative to normal saline solution for dissecting an infected mosquito's stomach, nor of borax-carmin as a good stain for showing up oocysts in a stomach-wall.

The ten pages allotted to antimalaria and antimosquito surveys and to mosquito control are not, by the author's own disavowal, intended to be exhaustive, and are, therefore, exempt from criticism. Of mosquito control he touches very briefly the main general principles, referring the reader to books on this particular subject; but it is a relief to encounter an expert who understands, as the author does, that however useful fish are in domestic and artificial waters, they cannot give much assistance to mankind under purely natural conditions. For malaria surveys he deliberately restricts himself to "a few suggestions," and these relate mostly to the composition of the staff and the conduct of some of the necessary entomological detail, including the determination by experiment in the laboratory—which he seems to think is sufficient—of the species of *Anopheles* that are susceptible to infection.

For all the detail of a mosquito survey, undertaken as one of the essentials of a malaria survey, the worker in the field and the laboratory could not wish a better book than this. But when its author goes on to assert, with axiomatic emphasis, that the responsible chief of an enterprise, so clearly within the domain of sanitation as an antimalaria survey, *must* be a trained entomologist, he must be prepared to meet with dissent. As well might

the zoologist whose studies are essential for the understanding of the natural history of tropical disease assume all the responsibilities of the physician.

A. Alcock.

EVANS (Alwen M.). [M.Sc., Lecturer on Entomology, Liverpool School of Tropical Medicine.] **A Short Illustrated Guide to the Anophelines of Tropical and South Africa.**—Liverpool School of Tropical Medicine Memoir (New Series) No. 3. 78 pp. With 10 text figs. & 12 plates. 1927. Oct. Liverpool: University Press Ltd. London: Hodder and Stoughton Ltd. [7s. 6d. paper; 9s. 6d. cloth.]

Medical and Sanitary Officers (and other dwellers) in Ethiopia should be grateful for this guide, since with its help—and without any abstruse knowledge of entomology—they can distinguish all the known anopheline species of that region and recognize at a glance those that are common and dangerous. Its contents include a key for the rapid discrimination of the several species, a succinct account of the appearance and behaviour of each species, and a series of text-figures and instructive and artistic plates to add transparency to an already lucid text.

The key is illustrated with an enlarged semi-diagrammatic figure of an *Anopheles*, upon which all the terms employed in the specific discriminations are graphically explained.

In the account of each species is to be found, to begin with, a full diagnosis of the adult and (if possible) a brief diagnosis of the larval form, followed by a summary of what is known respecting its habits, its breeding-places and larval behaviour, its pathogeny, and its geographical distribution. Superfluity of synonymy is avoided, the author generally avouching the authority of CHRISTOPHERS.

The text-figures mostly illustrate diagnostic features of different larvae. Of the plates, 5 illustrate diagnostic characters (of wing, leg, thorax, etc.) of adults, 6 are instructive pictures of breeding-places, and one is a formidable enlarged portrait of the ubiquitous and dangerous *Anopheles costalis*.

A. Alcock.

CARTER (Henry F.). **Report on Malaria and Anopheline Mosquitoes in Ceylon.**—*Ceylon. Sessional Paper VII.—1927. Mar.*—84 pp. With 10 maps, 21 charts & 34 figs. on 9 plates. 1927. Colombo.

This Report deals comprehensively with the Anophelines of Ceylon, and the prevalence of malaria in different parts of that island. The first Part discusses the work which had previously been done in Ceylon, and also the environment (climate, physiography, population, etc.). Part II relates to malaria, its seasonal and geographical distribution; the relative frequency of the different species of malaria parasite; the spleen rate, and its relation to age. The third Part is devoted to the indigenous species of *Anopheles*; in it we find the differential characters of adults and larvae; their distribution in Ceylon, and the relationship of the several species to the local prevalence of malaria. Special sections describe the natural enemies of *Anopheles*, and the species of that genus which breed in rice fields. The concluding Parts describe three local campaigns against malaria, and make recommendations for the future. The Appendix contains a mass of tabulated statistics, which will be of value to the worker in Ceylon, and which was rightly excluded from the text.

From this bald summary it will be realized that Mr. Carter has studied nearly every aspect of malaria and its vectors. The problem of malaria in

Ceylon is one of great complexity and difficulty, as the country itself is varied in structure and as some sixteen to eighteen species of *Anopheles* occur in it. One can here discuss only a few of the facts which are placed on record in this interesting work.

The centre of the southern part of Ceylon is high, much of it over 3,000 feet; it is crossed by lat. 7° N. On the slopes of the highlands above 1,600 feet malaria is only of moderate intensity, the spleen rate is below 5 per cent.; but in certain places between 1,600 and 3,000 feet spleen rates up to 20 per cent. occur, and the malaria in these places is apparently due in the main to *Anopheles maculatus*. Above 3,000 feet spleen rates are below 5 per cent., though *A. maculatus* remains common, and though there are plenty of villagers. It appears, therefore, that this species of *Anopheles* is only a major carrier in Ceylon when it occurs below a certain altitude; this in turn may be presumed to mean when the temperature is above a certain (unknown) point. But this is not consistent with our knowledge of what occurs in other countries; for the same species of *Anopheles* carries malaria successfully at 5 to 6,000 feet at Shillong (SHORTT), which is much further from the equator than any part of Ceylon, and therefore presumably colder, even in summer. In other parts of the world other species cause malaria at even greater altitudes; *A. willmori* and *plumbeus* are successful carriers at 7,500 feet at Murree (GILL); *A. gambiae (costalis)* has recently caused grave outbreaks of malaria in Kenya up to 6,000 feet; and indigenous malaria occurs at a height of about 9,000 feet at Quito, according to CHRISTOPHERS.

There is another unexpected fact in the distribution of malaria in Ceylon, though in this case it seems easier to explain the apparent anomaly. The north of Ceylon is all below 600 feet; the annual rainfall is between 50 and 75 inches,* and the rainfall is evenly distributed through the year. The centre and south of the island contains a rounded mass of mountain and plateau, much of it above 3,000 feet, and this area catches the S.W. monsoon, and receives a heavy rainfall with a definite seasonal maximum in June and July; the annual rainfall in this part of the island is between 100 and 200 inches.* The southern part of Ceylon, whether plain or hill, is on the whole much more densely populated than the north. But it is the northern, relatively dry, part of the island in which malaria is most grave, in this area the "Fever Group Death Rates" are between 8 and 15 per 1,000, and the spleen rates in children generally over 40 per cent. and in large areas over 60 per cent.* In the southern part of the island, where the population is denser and the rainfall heavier, the "Fever Group Death Rates" are between 4 and 10, the spleen rates below 5 per cent. in a large area, and even in the wet submontane zone not higher than from 10 to 20 per cent.

These curious facts are explained by studying the distribution of the species of *Anopheles*. In the wet areas, where malaria is less, the prevalent species are *A. subpictus*, *jamcsi*, *barbivrosus*, and *hyrcanus*, and the larvae of these four make up nearly 98 per cent. of all larvae identified, these species are rural, breeding in swamps, and apparently relatively harmless. In the north, where there is less surface water and much more malaria, the above four species only account for 71 per cent. of all larvae, and the larvae of four dangerous species (*A. listoni*, *culicifacies*, *fuliginosus* and *maculatus*) are a dozen times more prevalent than they are in the south; the increased prevalence of these species was mainly due to a very great increase in the relative frequency of *A. listoni*. In the dry but malarious zone agriculture is only possible by the aid of irrigation; the irrigation channels and the "tanks" provide permanent water in which the four dangerous species, and especially *A. listoni*, breed. In this fact, and perhaps also in the greater poverty of the people in the drier parts of Ceylon, lies the explanation of the apparent anomaly in the distribution of the disease.

In this Report, as in much other recent work, it is interesting to notice

* It is to be understood that these are broad generalizations only; for complete data see the maps and tables of the Report.

the increase in the use of actual measurements and the introduction of new units. Mr. Carter worked at 72 "stations;" at each he studied the Anophelines in six or eight "situations" (paddy, stream, tank, etc.), and in each situation he took 50 "samples," when it was possible. He presents his results in term of the number of larvae of each species per 100 standardized samples, the hundred samples being equally divided among the situations actually studied in each station.

The reader will find certain points to criticize, for which one cannot hold the author responsible. The great mass of data relating to climate in all parts of the world has been accumulated by meteorologists, and their objective is the study of the dynamics of the atmosphere. We biologists care nothing for that, but want to know about climate as it affects man, animal, or plant; we must therefore accumulate facts for ourselves. Shade temperatures taken in a double-louved screen and rain measured in a gauge in the middle of an open space are of slight interest to us. It is essential that we study the conditions in the swamp and the forest, the cow-shed and the house; we must, moreover, study a great range of climatic factors—among others, solar radiant heat, the seasonal incidence of ultra-violet radiation, the intensity of light, the prevalence of different *types* of rainfall (for it is clear that an inch of rain falling in half an hour is, biologically, entirely different from the same quantity of rain spread over twenty-four hours). One does not for a moment criticize the author for failing to do what has not yet been done anywhere in the tropics; but we do call attention to a grave deficiency in knowledge and in the biologists' vision of what should be done. Turning to the present Report, the occasional reader would find it much more easy to grasp the work which has been done if a fuller summary (with page references to the body of the text) had been printed. The tables would be more easy to understand if the explanatory headings were a little longer; it is a pity that some altitudes are given in feet, others in metres.

The illustrations from photographs are admirable, and the ten maps add greatly to the value and interest of the report. But it is not easy to use the maps, for nearly all of them are folded, in spite of the fact that the pages are $13\frac{1}{2}$ by $8\frac{1}{4}$ inches, which would have been large enough if the maps had been a little reduced in size. The headings and explanations are so placed that each map must be unfolded before one can discover what is on it. We think also that the Report is worthy of rather better type than it has received.

P. A. Buxton.

BUREAU OF HYGIENE AND TROPICAL DISEASES.

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[No. 2

RELAPSING FEVER AND OTHER SPIROCHAETOSSES.

NICOLLE (Charles) & ANDERSON (Charles). Etude comparative de quelques virus récurrentes, pathogènes pour l'homme. [**Comparative Study of Relapsing Fever Viruses Pathogenic to Man.**]—*C.R. Acad. Sci.* 1927. May 23. Vol. 184. No. 21. pp. 1225-1226.

— & — in collaboration with RAHAL (Magid). Etude comparative de quelques virus récurrents, pathogènes pour l'homme.—*Arch. Inst. Pasteur de Tunis.* 1927. June. Vol. 16. No. 2. pp. 123-206. With 11 charts in text. [22 refs.]

The investigations described in these papers concern four viruses of the relapsing fever type, viz., the Tunisian human strain, the Spanish strain, the African tick fever strain and the naturally occurring field vole strain of Dakar, all of which are known to be inoculable to man. They have been most exhaustively studied from the point of view of behaviour in experimental animals, immunity and transmission. The longer of the two papers gives a mass of experimental evidence on which the conclusions are based. It was found that the viruses fall into three groups: (1) The Tunisian human virus which is identical with the louse borne virus of other parts of the world; (2) the Spanish virus; (3) the virus of African tick fever and that of the field vole

C. M. Wenyon.

NICOLLE (Charles) & ANDERSON (Charles). Sur l'origine des fièvres récurrentes humaines. [**Origin of Relapsing Fevers in Man.**]—*Bull. Inst. Pasteur.* 1927. Aug. 15. Vol. 25. No. 15. pp. 657-665. [10 refs.]

For many years one of the authors has held the view that the constant origin of Tunisian louse borne epidemics of relapsing fever in districts near the Sahara would be explained by the discovery of a reservoir of the virus, probably a tick. Attempts to transmit the virus by *Ornithodoros savignyi* which might serve as a reservoir and which is common in Southern Tunis have failed. Two important facts have, however, recently come to light. These are the discovery of a tick-transmitted spirochaete in Spain and the field vole strain of spirochaete in Dakar. A third fact, which only became known after the article was written, is the occurrence of the natural gerbil strain and its transmission by *Ornithodoros normandi*. Of the numerous experiments which have

been conducted three are mentioned here. The Spanish strain is transmissible by the louse, the naturally occurring field vole strain of Dakar is infective to human beings, while this same strain by all tests applied is closely related to that of African tick fever.

The conclusion reached by the most interesting discussion which follows is that relapsing fever spirochaetes commenced as parasites of small mammals, became adapted to human beings through the agency of ticks and finally through their close association with lice acquired the property of survival in and transmission by these insects. The evolution has passed through the following stages:—

1. An infection of small mammals transmitted by ectoparasites which are possibly, though not necessarily, species of *Ornithodoros*.
2. The intervention of ticks of the genus *Ornithodoros* which obtain the virus and conserve it and which require large mammals for the maintenance of their adult stages.
3. The intervention of human beings infected by the ticks, more as an occasional accident than as a necessity.
4. The intervention of the louse by the adaptation to it of the spirochaete which is nevertheless still transmissible by the tick.
5. The complete adaptation to the louse and the consequent spread from Africa throughout the Old World.

C. M. W.

NICOLLE (Charles). L'évolution des spirochètes et le mécanisme de la crise dans les spirochètoses. [**Development of Spirochaetes and Mechanism of Crisis in the Spirochaetoses.**]—*Arch. Inst. Pasteur de Tunis*. 1927. June. Vol. 16. No. 2. pp. 207–217. [2 refs.]

This very interesting article commences with two assertions: (1) Relapsing fever spirochaetes have two stages, the one visible and the other invisible; (2) recovery occurs with a suddenness to which there is no parallel in other infections; the spirochaetes which have become extraordinarily numerous in the blood disappear in a few hours.

In the louse the spirochaetes taken up from the blood disappear during the first few hours. During six days it is impossible by any means available to demonstrate the organisms. Then suddenly they become exceedingly numerous in the body fluids.

In man the same series of events occurs. There are numerous spirochaetes in the blood and at the moment when they would appear to be triumphant they become less vigorous and agile, and before their actual destruction supervenes it can be noted that they assume a new form which is longer, thicker and less mobile and which may be termed *bacillary*. In a few hours all trace of spirochaetes is lost, but nevertheless the blood remains infective for several days. When relapse occurs this is announced by a return of fever and the re-appearance of typical spirochaetes. At the commencement of the relapse there may be few spirochaetes in the blood; yet a drop placed in sterile vaseline and incubated will in a few hours be swarming with them. Such cannot have arisen except from pre-existent invisible forms. As regards the virulence of the visible and invisible forms it has been shown that the fluids of the louse are most likely to infect shortly before spirochaetes re-appear. The invisible forms are thus most virulent at this particular stage. The evidence regarding the invisible forms in man is less certain, though if the infectivity of the blood when spirochaetes are not present be due to such, it is reasonable

to assume that invisible forms are present even when spirochaetes are numerous. The Spanish relapsing fever strain in the gerbil (*Meriones shawi*) gives rise to an infection without visible spirochaetes. Yet the merest trace of its blood will infect a guineapig, even by way of the conjunctiva, which allows of the passage of only an infinitesimal number of organisms.

There are thus three stages of the spirochaete—indifferent granules, previsible and infective forms, and the adult spirochaete in which arises once again the ancestral type, a saprophyte.

The capacity of the invisible forms to develop into spirochaetes varies in different experimental animals as also in the invertebrate hosts. Thus though the Spanish relapsing fever strain can be transmitted by the louse, spirochaetes never appear in these insects as they do in the ordinary relapsing fever strain.

The crisis in relapsing fever is thus to be regarded as the breaking up into invisible forms of the saprophytic spirochaetes under the influence of antibodies and the regrowth of these to the infective previsible forms and finally to the spirochaetes again. If there is defective antibody production, then there is a tendency for the saprophytic spirochaete to reproduce indefinitely and bring about destruction of the host by the sheer mass of organisms present. It is suggested that a similar conception may explain the behaviour of other organisms such as the pneumococcus.

C. M. W.

NICOLLE (Charles) & ANDERSON (Charles). D'une erreur commune dans la conduite des expériences portant sur la détermination des agents de transmission des spirochètoses et de la même erreur dans toutes les investigations analogues. [**Common Error in the Interpretation of Experiments on the Transmission of Spirochaetoses.**] —*Arch. Inst. Pasteur de Tunis*. 1927. Sept. Vol. 16. No. 3. pp. 228–232.

The article is written with the intention of emphasizing the warning already hinted at in another paper, namely, that it is fallacious to conclude that, because the inoculation to an animal of the products obtained by crushing an insect or other invertebrate which has previously ingested infective material produces infection, the insect or other invertebrate is capable of transmitting the virus in nature. In the case of the louse, which transmits relapsing fever by the escape of infective fluid from its body when damaged, it might be urged that the experiments objected to have been regarded as sufficient. But in this case it has been demonstrated that a person may be bitten by many thousands of infective lice without acquiring an infection, while the contamination of the slightest wound or the conjunctiva with the smallest quantity of fluid from such a louse will produce infection. Furthermore it has been shown that on the body it is the custom for lice to be damaged by crushing or the severance of a leg which permits of escape of fluid on to the skin. The mere injection of the fluid of crushed lice into animals would have been insufficient to incriminate the louse as a vector. In the case of ticks the infection produced by the unnatural method of injection of such fluid has frequently been regarded as proof that a vector is being dealt with, and the authors very rightly protest against these fallacious deductions. [The reviewer is

in entire agreement with these views, and has on several occasions pointed out in this *Bulletin* that the sand fly cannot, as a result of such inoculation experiments, be regarded finally as the vector of leishmaniasis till the natural method of infection has been elucidated, though the association of the fly with the disease and the particular type of development of the leishmania in the fly render it highly probable that it is the vector].

C. M. W.

ROSENHOLZ (H. P.) & GILBERT (M. J.). Weitere Untersuchungen über die Rolle der Wanzen in der Epidemiologie des Rückfallfiebers. [**Further on the Role of Bugs in the Epidemiology of Relapsing Fever.**—*Cent. f. Bakt.* I. Abt. Orig. 1927. Sept. 10. Vol. 103. No. 6-8. pp. 348-353. [3 refs.] [*Microb. Inst., Educ. Commissariat, R.S.F.S.R., Moscow.*]

Experiments on the behaviour of relapsing fever spirochaetes in bed bugs have already been described by the first author (this *Bulletin*, Vol. 24, p. 685). In the present paper further results are recorded. Attempts were made to infect mice by injecting them with crushed eggs or larvae resulting from adult bugs harbouring spirochaetes. In no case did infection occur. Similarly further attempts to transmit the spirochaetes by the bite of infected bugs gave only negative results. In this experiment the mice and bugs were kept together at 37° C., so that each mouse was bitten many times. The effect of low temperatures (+5° to -20° C.) was tested on infected bugs and it was found that though the bugs died at the lower temperature the spirochaetes in them did not lose their motility. Similarly the spirochaetes in the bugs were not seriously influenced by starvation. A 78 days' fast on the part of the bug did not influence the vitality or virulence of the spirochaetes. In certain starved bugs extraordinarily long fine regularly coiled motionless spirochaetes occurred and these did not regain their motility when the bugs were allowed to feed. The method of inoculating spirochaetes into the body cavity of bugs suggested the similar inoculation of other organisms with a view of testing their survival. The organism of rat bite fever could be demonstrated in the body fluid for 2 days, while *S. pallida*, *S. cuniculi* and *S. icterogenes* (*S. icterohaemorrhagiae*) survived only a few hours. Trypanosomes (*T. equiperdum*) could be recovered up to the 8th day. The previously recorded infections of bugs with relapsing fever spirochaetes were brought about by allowing bugs to feed on experimental animals. It is now shown that the same result is obtained by allowing bugs to feed on human beings suffering from relapsing fever. Immediately after the ingestion of spirochaetes these organisms appear in the body cavity fluid of the bugs and they persist there for the length of the observation (46 days). A drop of body cavity fluid at the end of 46 days produced infection in a general paralytic. It was noted that, if a bug became infected after feeding on a human being, the spirochaetes in its body fluid were reduced in number if the bug were given its next feed on mouse blood. The original number was regained only after 4 or 5 feeds, showing a gradual adaptation of the human spirochaetes to substances in the mouse blood.

C. M. W.

MACKIE (A. S.). **Relapsing Fever in Meru.**—*Kenya & East African Med. Jl.* 1927. July. Vol. 4. No. 4. pp. 121–122.

Relapsing fever, transmitted by ticks, is of common occurrence in Meru in Kenya. All the cases seen, except two, were in natives. The onset is sudden with headache, fever and generalized pains. Frontal headache is the chief symptom complained of. Enlargement of the liver or spleen, jaundice or bronchitis did not occur. On admission the temperature usually varied between 102° and 103° F. When N.A.B. is given the temperature falls to normal or subnormal on the 2nd, 3rd or 4th day. Spirochaetes are easily found in stained films and are numerous. It was not possible to follow the majority of cases, but one, a Somali syce, had four relapses, the longest interval being 28 days and the shortest 16 days. The habits of the tick vary, for in the North Frontier Province they live in the sand under acacia trees and attack as readily by day as by night, while in the Meru Reserve they occur mainly in the huts of the natives and probably bite only by night. In the native the bite is not followed by any local reaction, but the reverse is the case with the European.

C. M. W.

- i. MATHIS (C.), DURIEUX (C.) & EWSTIFEIEF (C.). Nouveau cas de fièvre récurrente contractée à Dakar. [**Relapsing Fever at Dakar.**]—*Bull. Soc. Path. Exot.* 1927. May 11. Vol. 20. No. 5. pp. 441–445. [7 refs.]
- ii. —. Foyer endémique de typhus récurrent à Dakar.—*Ibid* July 13. Vol. 20. No. 7. pp. 700–704. [6 refs.] [Pasteur Inst., Dakar.]

i. The first paper reports a case of relapsing fever at Dakar. It is the second in which the infection undoubtedly occurred in this town. The first case was noted recently by GUILLET (this *Bulletin*, Vol. 24, p. 688). The spirochaetes were isolated from the first case in mice, but the strain was unfortunately lost. From the second case the strain was isolated also and has been maintained easily in mice, in which it behaves like the organism of tick fever rather than that of the louse borne disease. The absence of ornithodoros at Dakar suggests some other vector, and the possibility of the spirochaete being that of the field vole—*Spirochaeta crocidurae*.

ii. The second paper records three further cases. Two of these were in natives who occupied one room. The first case did not reveal any spirochaetes on direct blood examination but the blood produced infection in mice. In the blood of the second case very rare spirochaetes were found and mice were again infected. The third case was also in a native, who was found comatose and moribund in the street. Blood examination revealed fairly numerous spirochaetes. The temperature was 39.6° C., there was a generalized jaundice and the urine contained much bile. The patient died without recovery of consciousness. At autopsy the liver, spleen and kidneys were congested, but without degenerative lesions. The bases of the lungs were likewise much congested while the stomach mucosa showed haemorrhagic spots. Mice inoculated with the patient's blood became infected, as also one of two mice inoculated with the products obtained from crushing four lice collected from the patient.

There appears to be no doubt that the three cases were of Dakar origin. As regards the spirochaetes isolated in mice they are readily handed on from mouse to mouse and in this respect resemble *S. crocidurae*. It is evident that at Dakar there is an endemic focus of relapsing fever.

C. M. W.

AZNAR (Pedro). Algunas investigaciones clínicas y experimentales sobre la fiebre recurrente española. [**Clinical and Experimental Study of Spanish Relapsing Fever.**—*Arch. Inst. Nac. Higiene de Alfonso XIII*. 1926. Oct. Vol. 4. No. 4. pp. 121-127. [16 refs.]

The author states that during an antimalaria campaign conducted in August, September and October, 1925 at Fuenteovejuna (Cordoba, Spain) four relapsing fever cases were seen which resembled clinically those described by de BUEN and others. Towards the end of 1924 certain experiments were commenced with a strain of spirochaete isolated from a human being by inoculation of a guineapig. The strain was readily passed from guineapig to guineapig as also to rats and mice. Certain cultural experiments were also successfully carried out. Various rats and mice which had recovered from a spirochaetal infection five months before were inoculated with either *Trypanosoma gambiense* or *T. brucei*. Two or three days later spirochaetes reappeared in the blood of all the mice and in some they persisted for one or two days after trypanosomes had appeared in the blood. This observation is in accord with those of various authors who have noted that after apparent recovery of animals the virus may still persist. [A similar observation was made by the reviewer who noted the reappearance of spirochaetes in a mouse inoculated with *Trypanosoma cruzi* (WENYON's *Protozoology*, Vol. 2, p. 1256).]

C. M. W.

DE BUEN (Sadi). Estado actual de nuestros conocimientos sobre la fiebre recurrente española. [**Existing Knowledge of Spanish Relapsing Fever.**—*Arch. Inst. Nac. Higiene de Alfonso XIII*. 1926. Oct. Vol. 4. No. 4. pp. 143-156. With 2 text figs. [11 refs.]

The paper describes relapsing fever in Spain with special reference to its transmission by the tick, *Ornithodoros maroccanus*, which frequents pig stys and appears to nourish itself on the pigs. The information is much the same as that contained in two papers previously reviewed (this *Bulletin*, Vol. 23, p. 590) but some new facts are brought forward. Mention is made of certain experiments by ORTEGA, who has demonstrated the infectivity of young ticks bred from infected adults. In the present paper the author gives the name of the spirochaete as *Treponema hispanicum* n. sp., though it had already been given in this form in the second of the two previous papers referred to above, and in the same form without the n. sp. in the first. The new name undoubtedly dates from the first paper.

Reference is again made to the attempts to infect pigs by inoculation of crushed ticks. These were not successful [as erroneously stated by the reviewer in his summary of the previous papers].

C. M. W.

HÖGLUND (Gustaf). Studien ueber die Blutveränderungen bei Febris recurrens africanus (Impfrecurrens). [**Blood Changes in African Relapsing Fever induced Therapeutically.**]—*Acta Med. Scandinavica*. 1927. Vol. 67. No. 1-2. pp. 105-165. With 1 folding diagram. [21 refs.] ["Karolinska" Inst., Stockholm.]

A very exhaustive examination of the blood in 29 cases of induced relapsing fever gave the following results: As a rule spirochaetes (*Treponema duttoni*) can be demonstrated in the blood by direct microscopical examination. Occasionally during the course of an attack an unusual type of organism appeared. This was shorter and thicker than the usual type, without spiral turns and extraordinarily motile. Rise in temperature at the onset of an attack was associated with a rapid rise in the number of white blood corpuscles. During the interval the number fell again to normal or even below it. With succeeding attacks these variations became less marked. The thrombocytes were affected in the reverse manner. There was a fall in number during the attacks. The rate of sedimentation of the red blood corpuscles is generally increased during the incubation period and infection, though remissions may occur during the intervals between attacks.

C. M. W.

LEBEDJEVA (M.) & SSINJUSCHINA (M.). Die Salvarsanbehandlung des Rückfallfiebers bei Ratten. [**Salvarsan Treatment of Relapsing Fever in Rats.**]—*Arch. f. Dermat. u. Syph.* 1927. July 4. Vol. 153. No. 2. pp. 487-491. [6 refs.] [Educ. Commissariat R.S.F.S.R. & Bact. Inst., "2. Universität," Moscow.]

Experiments have shown that it is not possible to eradicate a relapsing fever infection in all of a series of mice by means of salvarsan. In a varying percentage of animals the spirochaetes survive in the brain. Using rats for his experiments the author has found that they behave as mice have been found to do. He has also noted that as regards the number of animals which fail to be cleared of spirochaetes different strains of these organisms vary in their resistance to treatment.

C. M. W.

NICOLLE (Charles), ANDERSON (Charles) & COLAS-BELCOUR (Jacques). Sur un nouveau spirochète sanguicole pathogène (*Sp. normandi*) transmis par un Ornithodore (*Orn. normandi*), hôte des terriers de rongeurs nord africains. [**New Blood Spirochaete transmitted by Ornithodorus sp. living in Rodent Burrows.**]—*C.R. Acad. Sci.* 1927. Aug. 1. Vol. 185. No. 5. pp. 334-336.

—, — & —. Note préliminaire sur un nouveau spirochète sanguicole pathogène (*Sp. Normandi*) transmis par un Ornithodore (*Orn. Normandi*) hôte des terriers de rongeurs nord-africains.—*Arch. Inst. Pasteur de Tunis*. 1927. Sept. Vol. 16. No. 3. pp. 219-221. [1 ref.]

The tick *Ornithodorus normandi* inhabits the burrows of rodents, particularly those of the gerbil *Meriones shawi* in Tunis. Six of these ticks revealed, in the fluid obtained by crushing them, a spirochaete of the relapsing fever type which was inoculable to the mouse, rat and monkey. The name *Spirochaeta normandi* is given to this organism

Furthermore, a batch of nymphs and adults of the tick infected a gerbil by their bites while a captured gerbil was found to have a natural infection. Ticks collected near the spot where this gerbil was caught infected another gerbil by their bites. It was thus demonstrated that *Ornithodoros normandi* is the transmitting agent of a naturally occurring spirochaetosis of the gerbil. Attempts to transmit the spirochaete from monkey to monkey through the agency of lice failed. The new spirochaete differs from that of universal relapsing fever by the definiteness and duration of the infection in mice and by its transmission by the tick and not by the louse; from that of Spanish relapsing fever by its non-transmission by the louse and absence of pathogenicity for the guineapig. It resembles those of African tick fever and the natural field vole infection (*Sp. crocidurae*). Serological investigations so far conducted substantiate the specificity of *Sp. normandi*. It seems possible that this organism might be transmitted to man, as it is known that *Ornithodoros normandi* will bite human beings.

C. M. W.

NICOLLE (Charles) & ANDERSON (Charles). Transmission du spirochète de la musaraigne par *Ornithodoros moubata* et mécanisme de la transmission des spirochètes récurrents par les tiques. [**Transmission of Field Vole Spirochaete by *O. moubata*. Mechanism of Transmission of Spirochaetes by Ticks.**]—*C.R. Acad. Sci.* 1927. Aug. 8. Vol. 185. No. 6. pp. 373-375.

— & —. Note préliminaire sur la transmission du spirochète de la musaraigne par *Ornithodoros moubata* et sur le mécanisme de la transmission des spirochètes récurrents par les tiques.—*Arch. Inst. Pasteur de Tunis.* 1927. Sept. Vol. 16. No. 3. pp. 222-224. [1 ref.]

The naturally occurring field vole spirochaete of Dakar (*Sp. crocidurae*) is shown to be transmissible by *Ornithodoros moubata*, the vector of the spirochaete of African tick fever (*Sp. duttoni*). Nymphs fed on infected animals will transmit the infection when fed again on healthy ones. Adults fed on infected animals are unable to transmit the infection, but the nymphs of the next generation, hereditarily infected, are able to do so. Whether adults developing from infective nymphs are infective is not yet known, though this seems possible, since the authors have demonstrated it in the case of the spirochaete of Spanish relapsing fever and *Ornithodoros maroccanus*. They have also shown that adults of *O. maroccanus* fed on infected animals are unable to infect other animals. It is known, however, from the experiments of ORTEGA that the infection can be passed to the nymphs of the next generation. These experimental results are in support of the authors' opinion that in the tick-transmitted infections the principal vectors are the nymphs and that the small mammals are the hosts of preference for the spirochaetes; the transmission by adult ticks and the infection of large mammals, particularly man, are of recent introduction and play no part in the natural maintenance of the virus.

A word of warning is given to those who assume that because the fluids from crushed ticks are infective the ticks are therefore transmitters of the particular virus: only the natural method of infection should be taken into account in drawing such conclusions.

C. M. W.

BRUMPT (E.). Transmission du *Treponema crocidurae* par deux *Ornithodoros* (*O. moubata* et *O. maroccanus*). [Transmission of *T. crocidurae* by Two Species of *Ornithodoros*.]—*C.R. Acad. Sci.* 1926. Dec. 6. Vol. 183. No. 23. pp. 1139-1141.

The spirochaete *Treponema crocidurae* which was discovered by ANDRÉ LEGER in 1917 in the field vole, *Crocidura stampfli*, of Dakar has since been found to occur naturally in various rats and mice in the same locality, viz., *Mus decumanus*, *Mus coucha*, *Golunda campanae*. The spirochaete, which is morphologically identical with the relapsing fever spirochaetes, is inoculable to human beings, monkeys and the ordinary laboratory animals. The author has now shown that nymphs of both *Ornithodoros moubata* and *O. maroccanus* can retain the virus after feeding on infected mice for 30 and 25 days respectively. The nymphs were fed on the mice, kept till they had moulted and then crushed and injected into other mice. It is concluded that the spirochaete is transmissible by both these ticks. In a footnote it is stated that *Treponema hispanicum*, the relapsing fever spirochaete of Spain, which is transmitted in nature by *Ornithodoros maroccanus*, may also be transmitted by *O. moubata* and *Haemaphysalis inermis*. Details of the experiments are not given, but presumably they are of the kind noted above. [In papers by NICOLLE and ANDERSON reviewed above it is stated that this type of experiment does not prove that the ticks are actual transmitters.]

C. M. W.

NICOLLE (Charles) & ANDERSON (Charles). Transmission expérimentale du spirochète de la récurrente espagnole par l'*Ornithodoros moubata* et mécanisme de cette transmission. [Transmission of Spirochaete of Spanish Relapsing Fever by *O. moubata*. Its Mechanism.]—*C.R. Acad. Sci.* 1927. Aug. 22. Vol. 185. No. 8. pp. 433-434.

— & —. Note préliminaire sur la transmission expérimentale du spirochète de la récurrente espagnole par l'*Ornithodoros moubata* et mécanisme de cette transmission.—*Arch. Inst. Pasteur de Tunis.* 1927. Sept. Vol. 16. No. 3. pp. 225-227. [1 ref.]

Experiments conducted with the spirochaete of Spanish relapsing fever have shown that it may be transmitted by *Ornithodoros moubata*, which is not its natural vector. The adults, which can harbour spirochaetes for long periods, are not themselves capable of transmitting them by their bites. The nymphs bred from such adults are able to do so, but only at their second feed on an animal. Thus *O. moubata* in addition to being the natural vector of the spirochaete of African tick fever is able also to transmit by the bite of the nymph the naturally occurring field vole spirochaete (*Sp. crocidurae*) and that of Spanish relapsing fever.

C. M. W.

NICOLLE (Charles) & ANDERSON (Charles). Sur la résistance du porc au virus de la fièvre récurrente espagnole et sur les conditions naturelles d'existence de cette maladie et d'autres spirochètoses. [Resistance of the Pig to Spanish Relapsing Fever.]—*C.R. Acad. Sci.* 1927. May 30. Vol. 184. No. 22. pp. 1305-1306.

In his original account of the transmission of relapsing fever in Spain by *Ornithodoros maroccanus* (this *Bulletin*, Vol. 23, p. 590) DE

BUEN pointed out that the tick never lived away from pigs, and it was naturally suggested that the pig would be found to be the reservoir of the virus. The authors of the paper under review have attempted to infect pigs by inoculating them with virulent blood, but without effect. As a result they suggest that the reservoir of the virus is likely to be found amongst the small rodents which live in and around the pig stys and which would serve as more suitable hosts for the young ticks than the thick-skinned pigs. [In the review of DE BUEN'S paper in this *Bulletin* (*loc. cit.*) the reviewer erroneously stated that pigs had been infected by the injection of crushed ticks. Actually the injection failed to produce an infection.]

C. M. W.

GWÉLESSIANY (J.). Recherches sur le passage des spirochètes à travers les muqueuses et la marche des infections mixtes spirochèto-trypanosomiennes. [**Penetration of Mucosa by Spirochaetes Alone and in Mixed Infections with Trypanosomes.**]—*Bull. Soc. Path. Exot.* 1927. July 13. Vol. 20. No. 7. pp. 653-664. [27 refs.] [Pasteur Inst., Paris.]

The experiments of IWANOFF and MESNIL which demonstrated that, contrary to the generally accepted view, *Trypanosoma equiperdum* was unable to pass through a healthy mucous membrane [see this *Bulletin*, Vol. 24, p. 972] led the author to reinvestigate the relapsing fever spirochaetes from the same point of view. As in IWANOFF and MESNIL'S experiments the greatest care was taken to exclude the possibility of an injured mucosa by keeping the animals to be used under conditions of food and fodder that could not produce the slightest abrasion. Before applying infective material the mucous membrane was carefully examined with a lens. As a control *Trypanosoma equiperdum* was used. The outcome was that it was demonstrated that both *Treponema duttoni* and *T. crociduræ* were able to pass through the healthy mucosa of the mouth or eye. When a mixture of spirochaetes and trypanosomes was applied the spirochaetes alone penetrated.

C. M. W.

STEINER (G.) & STEINFELD (J.). Experimentelle Untersuchungen zur Pathologie und Therapie der Spirochätenkrankheiten. Parabiöse bei experimenteller Recurrens. [**Pathology and Therapy of Spirochaete Diseases. Parabiosis.**]—*Klin. Woch.* 1927. Aug. 20. Vol. 6. No. 34. pp. 1597-1599. [11 refs.] [Psychiat. Clinic Univ. Heidelberg.]

Various investigations have shown that when mice have recovered from experimental relapsing fever spirochaetes persist in the brain substance for long periods as demonstrated by inoculating brain emulsion into healthy mice. In no circumstances do these latent spirochaetes ever reinvade the blood stream which with its antibodies appears to act as an impenetrable barrier. The authors have treated the mice in many ways in order to bring about such an invasion but without result. They now describe a further attempt which consisted in uniting parabiotically a healthy and a recovered animal with a view to discovering whether the healthy animal would be invaded with spirochaetes. No such invasion occurred, the healthy united animal

quickly acquiring a passive immunity. It was demonstrated that if one of two healthy united animals were inoculated with spirochaetes both acquired an infection. [AZNAR, in a paper reviewed in this number, records the return of spirochaetes to the blood under the influence of a trypanosome injection.]

C. M. W.

BRUYNOGHE (R.) & DUBOIS (A.). L'utilisation des glucides par *Spirochaeta duttoni*. [**Use of the Glucides by *S. duttoni*.**—*C.R. Soc. Biol.* 1927. May 27. Vol 96. No. 17. pp. 1403-1404. [1 ref.]

Having shown that trypanosomes which have become immobile may be revitalized by the addition to the medium of various sugars, particularly glucose, the author wished to discover whether spirochaetes were similarly affected. Very fair infections of spirochaetes (*T. duttoni*) could be obtained in mice if they were inoculated with both spirochaetes and trypanosomes. At the moment when the trypanosomes were very numerous and had produced a hypoglycaemia it was noted that the spirochaetes were even more susceptible than the trypanosomes, for they became motionless sooner. If sugar solution be added to a suspension in which both organisms have become immobile the mobility returns. When artificial hypoglycaemia was produced by means of insulin, though the results were not very definite, it was clear that the spirochaetes taken before the administration of insulin remained mobile for a longer time than those taken after it. It is concluded that the glucides are indispensable for the metabolism of spirochaetes, particularly for their powers of movement.

C. M. W.

LEBEDJEWA (M.). Die elektive Lokalisation der Recurrensspirochäten im Nervengewebe. [**Affinity of Relapsing Fever Spirochaetes for Nerve Tissues.**—*Arch. f. Dermat. u. Syph.* 1927. July 4. Vol. 153. No. 2. pp. 531-535. [13 refs.] [Educ. Commissariat, Moscow.]

An investigation of the brain, liver, spleen and kidneys of mice infected with relapsing fever spirochaetes has shown that the organisms are only occasional parasites of the blood. They show a marked affinity for the tissues of the nervous system.

C. M. W.

KRITSCHIEWSKI (I. L.). Die experimentellen Grundlagen der Lehre von den neurotopen und somatotropen Rassen der Spirochäten. [**Neurotropic and Somatotropic Races of Spirochaetes. Experimental.**—*Klin. Woch.* 1927. July 16. Vol. 6. No. 29. pp. 1370-1374. [13 refs.] [Educ. Commissariat, R.S.F.S.R., Moscow.]

Inoculating mice with three races of relapsing fever spirochaetes it was found that they differed as regards their persistence in the central

KANAGARAYER (K.). **Spirochaetal Pulmonary Gangrene.**—*Malayan Med. Jl.* 1927. Vol. 2. No. 2. pp. 58-60. [3 refs.] [Inst. Med. Research, Kuala Lumpur.]

Seven cases of pulmonary gangrene are described in which spirochaetes and fusiform bacilli were found either in the sputum or gangrenous areas in the lungs. The organisms were indistinguishable from those in Vincent's angina, dental caries, pyorrhoea alveolaris and bronchial spirochaetosis. All the cases developed during the course of pneumonia as a result of invasion from oral, dental, tonsillar or bronchial lesions. In Malaya pneumonia is if anything more common amongst Tamils than Chinese but pulmonary gangrene is more common amongst Chinese, who also show a greater incidence of oral lesions.

C. M. W.

SMITH (Curtis E.) & RUSK (G. Y.). **Pulmonary Spirochetosis.**—*Amer. Jl. Path.* 1927. May. Vol. 3. No. 3. pp. 225-233. With 4 figs. on 2 plates. [9 refs.]

As a result of the study of the lungs in certain fatal cases in which spirochaetes were found in the sputum before death the authors suggest that the serious pathological conditions would still have been present if the lungs had never become infected with spirochaetes, which are frequently found in the sputum and lung tissues of patients with pulmonary abscess or gangrene. The frequent association of fusiform bacilli suggests that the spirochaetes may be of the Vincent type and not a definite entity. All forms of pulmonary spirochaetosis probably represent secondary infection. The presence of spirochaetes in large numbers, deeply situated in the tissue, suggests some pathogenic influence.

C. M. W.

ARAVANTINOS (Jean D.). Un cas de bronchite sanglante de Castellani. [**Bloody Bronchitis of Castellani.**]—*Grèce Méd.* 1927. Mar.-Apr. Vol. 29. No. 3-4. pp. 14-16. [4 refs.]

A case of bronchial spirochaetosis with haemoptysis which recovered under a course of stovarsol treatment.

C. M. W.

VINCENT (H.). Sur la fuso-spirochétose des voies respiratoires. Sa localisation bronchique. [**Fuso-Spirochaetosis of the Respiratory Tract.**]—*Bull. Acad. Méd.* 1926. Oct. 19. Year 90. 3rd Ser. Vol. 96. No. 33. pp. 135-145. [2 refs.]

This is a long argument in defence of the position that the organism of bronchial spirochaetosis is no other than that of Vincent's angina.

C. M. W.

RAT-BITE FEVER.

RUYS (A. Charlotte). Zweedraadkleuring voor den spiril van de rattebeetziekte. [**Classification of the Organism of Rat-Bite Fever.**]—*Geneesk. Tijdschr. v. Nederl.-Indië*. 1926. Vol. 66. No. 6. p. 800. With 1 plate.

———. Klassifikation des Erregers der Rattenbisskrankheit.—*Cent. f. Bakt.* 1. Abt. Orig. 1927. Aug. 5. Vol. 103. No. 4-5. pp. 268-270. With 8 text figs. [4 refs.] [Inst. Trop. Hyg., Amsterdam.]

These notes emphasize the difference between the organism of rat bite fever and true spirochaetes. The movements are not those of a spirochaete, while suitable staining demonstrates numerous flagella at each end and not a single one as figured by NOGUCHI (1926). That the organism was more nearly related to the spirilla was first shown by ADACHI (*Jl. Exper. Med.*, 1921, Vol. 33, p. 647) and later by ZUELZER (*Cent. f. Bakt.* 1. Abt. Orig., 1921, Vol. 85, p. 154*). The author agrees with these conclusions, which have been drawn also by ROBERTSON (this *Bulletin*, Vol. 22, p. 179). The papers are illustrated by a series of good microphotographs.

C. M. Wenyon.

HEITZMANN (Otto). Vergleichende pathologische Anatomie der experimentellen Rattenbisskrankheit und der Infektion mit Mäuse-spirillen. [**Comparative Pathology of Experimental Rat-Bite Fever and Infection with Mouse Spirilla.**]—*Arch. f. Dermat. u. Syph.* 1927. July 4. Vol. 153. No. 2. pp. 399-406. [10 refs.] [Reich Health Office, Berlin-Dahlem.]

An examination of the tissues of guineapigs infected with the organism of rat bite fever and the naturally occurring and similar organism of mice has shown that the histopathological changes produced are the same. This affords additional evidence of the identity of the two organisms.

C. M. W.

CILENTO (R. W.). **Rat Bite Fever in New Guinea.**—*Med. Jl. Australia*. 1927. Aug. 6. Vol. 2. No. 6. pp. 191-193. With 1 chart. [1 ref.]

A patient who came under observation on December 9th in New Guinea after having had attacks of fever since October. His blood showed rings of subtertian malaria and he was treated with quinine. The temperature, however, did not respond, and he was admitted to Rabaul Hospital on December 30th. There were no malarial parasites in the blood, and on account of the relapsing type of fever of six-day periodicity the case was diagnosed provisionally as one of relapsing fever. Later the patient stated that he had been bitten on the thumb on November 6th by a flying squirrel, and that twelve days later the wound had festered and had led to lymphangitis. This suggested "rat bite fever." Blood examination was instituted, and with the dark ground "a short organism was distinctly seen which appeared to resemble a leptospira rather than a spironeme, and was apparently about 6μ in length." Subsequent drops of blood revealed occasional organisms of the same type. A diagnosis of rat-bite fever was made and treatment with novarsenobenzol instituted. The patient was discharged cured on February 5th.

[The accuracy of the diagnosis is unfortunately invalidated by the account of the organism. It is hardly possible for the spirillum of rat-bite fever to be mistaken for a leptospira.]

C. M. W.

RUBINO (Anthony P.). **Two Cases of Rat-Bite Fever.**—*Public Health Rep.* 1927. Aug. 19. Vol. 42. No. 33. pp. 2097–2099.

Two cases of rat-bite fever in a man 42 years of age and his son 17 years of age, both of whom were bitten while catching rats for experimental purposes. The diagnosis was based on the intermittent relapsing fever following rat bite, the regional lymphadenitis without suppuration, the characteristic exanthem and the response to neosalvarsan treatment.

C. M. W.

SALIMBENI (A. T.) & SAZERAC (R.). Action du bismuth sur le spirochète du Sodoku dans l'infection expérimentale du cobaye. [**Action of Bismuth on the Sodoku Spirochaete in Guinea-pig Experiment.**]—*C.R. Acad. Sci.* 1927. June 13. Vol. 184. No. 24. pp. 1497–1499.

By emulsifying in 10 cc. of physiological saline solution the spleen of a mouse infected with the organism of rat bite fever and filtering through metallic gauze a fluid is obtained which will produce in guinea-pigs an acute (15–20 days) or a chronic (2–3 months) infection according to the dose of virus employed. The chronic infection is best produced by injecting 1 cc. of the filtered emulsion. Ten guinea-pigs were each given a subcutaneous injection of tartrobismuthate of soda (1 in 100 aqueous solution) in a dose of 1 centigram for each 100 grams of body weight. One hour later these 10 animals and 10 controls were given subcutaneously 0.5 cc. of virus. After 2 or 3 days incubation there developed at the site of inoculation in all the controls an area of infiltration which increased in size and developed into a veritable chancre in which the causative organism was demonstrated. The organism appeared in the blood between the 8th and the 11th day. The other mice developed no infection, thus demonstrating that the drug had completely protected them. Using the drug as a curative agent after infection had been established it was possible to produce only a remission of symptoms which reappeared in 10 to 12 days. A further dose brought about another similar remission, but a definite cure was not obtained. It is thus evident that bismuth has a definite action on the organism of rat bite fever.

C. M. W.

NAKAMURA (Sohji). [**On the Complement Fixation Reaction in Rat-Bite Fever.**]—*Kei-O Igaku (Jl. Kei-O Med. Soc.)*. 1926. July. Vol. 6. No. 7. [Summarized in *Japan Med. World.* 1927. Mar. 15. Vol. 7. No. 3. pp. 79–80.]

A rat-bite fever reactive substance and a haemolysin appear in the serum of experimentally infected rabbits. The former is destroyed by administration of salvarsan to a rabbit which is developing these substances. For the haemolytic reaction it was necessary to add both visceral extracts and cholesterine.

C. M. W.

INFECTIOUS JAUNDICE AND OTHER LEPTOSPIROSES.

LANGWORTHY (Virginia) & MOORE (Anna C.). **A Study of *Leptospira icterohaemorrhagiae*.**—*Jl. Infect. Dis.* 1927. July. Vol. 41. No. 1. pp. 70–91. With 2 figs. [83 refs.] [New York State Dept. of Health, Albany.]

Reference is again made to the outbreaks of infectious jaundice which occurred in New York State during autumn 1921 and the winter of 1922 (see this *Bulletin*, Vol. 19, p. 561). Further work has been done, particularly in connexion with the leptospira found in rats. It seems clear that the outbreaks of jaundice referred to were not of leptospiral origin and that the etiology is still unknown. As regards rats leptospira was demonstrated in over 40 per cent. of the animals while immunological tests with rat sera showed that over 60 per cent. were infected. The organism isolated from these Albany rats after exhaustive investigations was found to be apparently identical with *Leptospira icterohaemorrhagiae*. The instance of the human being who was accidentally infected in the laboratory with one of the rat strains is again mentioned. Even 4 years after recovery the serum of this person gave marked protection to guineapigs against virulent strains of *L. icteroides* and *L. icterohaemorrhagiae*.

C. M. Wenyon.

TOWLER (Harry H.) & WALKER (John E.). **Spirochetal Jaundice. Report of a Case.**—*Jl. Amer. Med. Assoc.* 1927. July 9. Vol. 89. No. 2. pp. 86–89. [31 refs.] [Walter Reed General Hosp. & Army Med. School.]

The paper describes a typical case of leptospiral jaundice, this being the sixth proved case to be reported in North America. Guineapigs were infected by inoculation with the patient's blood on the ninth day of the illness. They showed the characteristic lesions while cultures of the organism were obtained from their blood.

C. M. W.

MACKIE (T. J.) & McLACHLAN (D. G. S.). **Report of an Investigation into an Outbreak of Infectious Jaundice.**—*Edinburgh Med. Jl.* 1927. Aug. N.S. Vol. 34. No. 8. pp. 456–465. [12 refs.] [Bact. Dept., Edinburgh Univ.]

The paper describes an outbreak of infectious jaundice comprising four cases at a farm near Cumnock, Ayrshire, and three at a "cothouse" about a mile and a half distant. The illness was of an exceedingly mild type, of short duration and followed by rapid convalescence. Young persons only were affected and there was a familial incidence. A laboratory investigation of urine from four cases revealed "atypical leptospiras" in three. In two cases the organisms were inoculated into guineapigs. From one case two were inoculated—one of these animals died on the 20th day and showed "spotted" haemorrhages in the lungs and also haemorrhages in the diaphragm, kidneys, stomach wall and axillae. There was no jaundice and no leptospiras could be found. The other animal which had been ill was killed on the 15th day and showed irregular haemorrhages in the lungs. From another

case one guineapig was inoculated with the urine deposit. It died on the 8th day and showed haemorrhages in the lungs and kidney, and as in the other animals no leptospiras were seen and sub-inoculations were negative. As regards the intervals between the cases in the two families, the last case in each occurred at an interval of about a month after the onset of the previous case. Though the absolute proof has not been obtained it would seem possible that the outbreak was due to a strain of *Leptospira icterohaemorrhagiae* of low virulence.

C. M. W.

MELNOTTE (Pierre) & FARJOT (Antonin). La spirochétose ictérique au Maroc. [**Spirochaetal Jaundice in Morocco.**]—*Arch. Inst. Pasteur d'Algérie*. 1927. Mar. Vol. 5. No. 1. pp. 41-47. ["Auvert" Hosp., Fez.]

During 1925 and 1926 the authors have seen seven cases which corresponded clinically with those of infectious jaundice. Spirochaetes were discovered in the urine of six, but guineapigs inoculated from two of the cases did not become infected. In two cases there was a complication—malaria in one and paratyphoid A in the other. All the cases terminated in recovery. It is admitted that the diagnosis is incomplete in that guineapigs were not infected and serological tests were not made. In view of these cases it is suggested that facilities for carrying out these tests should be instituted in Morocco. It is noted that spirochaetes were seen in a kidney smear of a rat captured near the habitations of the patients.

C. M. W.

MORISSEAU (R.). Considérations cliniques sur quelques spirochétoses ictéro-hémorragiques à forme épidémique. [**Epidemic Ictero-haemorrhagic Spirochaetoses.**]—*Rev. Méd. et Hyg. Trop.* 1927. May-June. Vol. 19. No. 3. pp. 84-86.

For several years a spirochaetosis has been recognized in French West Africa which, rapidly acquiring an epidemic character, attacks first the natives and then the Europeans. The symptoms are often serious and comprise violent headache, bilious vomiting, lumbar pains and a temperature of 39 to 40° C. After a remission there is a further rise in temperature, the vomit becoming black and haemorrhagic, with haemorrhages and epistaxis. Sometimes there is recovery but more usually a fatal issue. An epidemic of the kind was seen by Dr. STEVENEL at Bouaké on the Ivory Coast. Spirochaetes with some resemblance to Noguchi's leptospira were seen in the blood but stegomyia was so rare that a diagnosis of yellow fever could not be made. Another centre of infection was noted at Mankouo by Dr. BLANQUIER. In this case it appeared possible that there was a water origin of the epidemic, as the natives were compelled to take their water from a highly contaminated source. A third epidemic was seen at Toukoto by Dr. BRAY. In this case the Europeans alone were involved, the natives, in the midst of whom the Europeans lived, being regarded as reservoirs of the virus.

C. M. W.

Jo (Masanori). Ueber die Pathogenese des Ikterus bei der Spirochaetosis icterohaemorrhagica (Weil'sche Krankheit). [**Pathogeny of Jaundice in Weil's Disease.**].—*Scientific Reports Govt. Inst. Infect. Dis.* Tokyo. 1926. Vol. 5. pp. 283-285. With 7 figs. on 2 plates (1 coloured). [5 refs.]

An investigation of the histopathology of Weil's disease together with the bilirubin reaction of the blood serum and the changes in the bile has led the author to the conclusion that the jaundice is not, in the early stages at least, an obstructional jaundice. It is due rather to an over production of bile pigments as a result of increased red cell destruction combined with a loss of function by the damaged liver cells.

C. M. W.

BERNARD (Etienne) & GILBERT-DREYFUS. Rôle de l'action hypothermisante de l'azotémie sur la courbe thermique de la spirochétose ictérique. Recrudescence fébrile et rechute hypothermique. [**Azotaemia and Fall of Temperature in Leptospiral Jaundice.**].—*Bull. et Mém. Soc. Méd. Hôpit. de Paris.* 1927. Nov. 10. Year 43. 3rd Ser. Vol. 51. No. 31. pp. 1467-1485. With 5 text figs. [22 refs.]

The paper is a lengthy discussion of the cause of the fall in temperature followed by a relapse which was observed in a case of leptospiral jaundice. It was noted that the patient was in the most serious condition after the temperature had fallen and before the relapse. As in other infections a similar fall in temperature had been found to be associated with an increase in the nitrogenous substances of the urea group of the blood. In fact the quantity of these substances present varied inversely with the temperature. It is concluded that the fall in temperature between the initial attack and relapse in leptospiral and other spirochaete infections is not due to a remission of the disease, but to the temperature being forced down by the increasing intensity of the azotaemia.

C. M. W.

- i. SAZERAC (R.) & NAKAMURA (Hiroshi). Pouvoir préventif et pouvoir curatif du bismuth vis-à-vis du "Spirochaeta icterohaemorrhagiae." [**Bismuth in the Prevention and Cure of Icterohaemorrhagic Spirochaetosis.**].—*Bull. Acad. Méd.* 1927. June 7. Year 91. 3rd Ser. Vol. 97. No. 23. pp. 774-776. [4 refs.]
- ii. SAZERAC (R.), HOSOYA (S.) & STEFANOPOULO (G.). Action du bismuth sur le "*Leptospira icteroïdes*" (agent infectieux de la fièvre jaune, d'après NOGUCHI).—*Bull. Acad. Méd.* 1927. July 26. Year 91. 3rd Ser. Vol. 98. No. 30. pp. 152-153. [4 refs.]

i. Experiments similar to those detailed above (p. 98), have been conducted with *Leptospira icterohaemorrhagiae*. Tartrobismuthate of soda will not only protect guineapigs against infection but will bring about a cure if given before the fourth day of an infection. By re-inoculating animals at varying intervals after recovery following treatment it was found that the protective action of the drug might persist as long as five months.

ii. Similar experiments have been conducted with a strain of *Leptospira icteroides* which produced death in guineapigs in 4 days. Very similar results were obtained, a fact which affords additional evidence of the close relationship of *L. icteroides* and *L. icterohaemorrhagiae*.

C. M. W.

WALCH (E. W.) & WALCH-SORGDRAGER (G. B.). **Observations on *Leptospira icterohaemorrhagiae* in the Wild Rats of Baltimore.**—*Amer. Jl. Hyg.* 1927. July. Vol. 7. No. 4. pp. 393-406. With 1 plate. [22 refs.] [Sch. of Hyg. & Pub. Health, Johns Hopkins Univ.]

The examination of 51 Baltimore rats (*Mus norvegicus* and *Mus decumanus*) during the period November, 1924, to January, 1925, resulted in the discovery of leptospira in 17 (33 per cent.). Of the 17 strains 6 were virulent to guineapigs and of these 2 could be transmitted from animal to animal. Serologically there was evidence that the Baltimore strain was the same as those of other cities. Of 9 filtration experiments with virulent liver emulsions diluted fifteen times, through Berkefeld candles V, one filtrate was obtained which caused death with typical symptoms when injected into two guineapigs, though no leptospira could be seen in it. Filtering young virulent cultures through Berkefeld candles V, N and W yielded filtrates in which leptospira could always be detected.

C. M. W.

- i. WILBERT (R.). Sur une maladie infectieuse du chimpanzé, transmissible à l'homme. [**An Infectious Disease of the Chimpanzee Transmissible to Man.**]—*C.R. Acad. Sci.* 1927. Sept. 12. Vol. 185. No. 11. pp. 569-571.
- ii. — & DELORME (M.). Sur une spirochétose ictéro-hémorragique du chimpanzé transmissible à l'homme.—*Ann. Inst. Pasteur.* 1927. Nov. Vol. 41. No. 11. pp. 1139-1155. [8 refs.] [Pasteur Inst., Kindia, French Guinea.]

i. In January of this year the Institut Pasteur of Kindia received six chimpanzees from the Ivory Coast. Nine other animals died en route. The six which arrived did not appear happy, and had capricious appetites. On 13th March an epizootic broke out amongst the chimpanzees, which included 17 others which had come from Guinea. All died, except one which recovered, in 16 to 11 days. The main symptoms were fever, which reached 40·8° to 41° C. falling to 36° C. before death, general prostration and embarrassed respiration, congestion and sub-icteric tinging of the conjunctivae, swelling of the abdomen with hyperaesthesia especially of the epigastric region, haemorrhagic vomit and constipation followed by diarrhoea. At autopsy there was found sub-icterus, suffusions of blood, pulmonary infarcts, peritonitis, congestion and localized gangrene of the intestine, slight enlargement of the spleen, fatty degeneration of the liver, petechial haemorrhages in the gastric mucosa, altered kidneys, injection with haemorrhagic spotting of the central nervous system, cerebro-spinal fluid turbid and bloodstained. There was further a polynuclear increase while the urine was greenish in colour and contained albumin. In the blood, liver, spleen, kidneys and nervous system was found a spirochaete which

performed slow rotary movements and measured 6·7 by 0·2 microns. It stained like other spirochaetes and was cultured in N.N.N. medium and in rabbit blood medium. The organisms survived in the cultures for 12 to 25 days. Nothing is said of sub-culture. It is stated that the virus is transmissible to the chimpanzee, to the guineapig and also to man, as occurred in the case of the author, who showed the following symptoms—rectal temperature 40·6° C., congested conjunctivae, sub-icterus, scanty urine, anorexia, vomiting, delirium and nightmare, asthenia and an attack of haemorrhagic cystitis. The spirochaete occurred in the blood which inoculated to a chimpanzee brought about its death. The investigation was not pursued any further.

The author thinks that yellow fever should be considered, but it must be admitted that the statements, especially those about the spirochaetes, are not entirely satisfactory. Was he dealing with pseudospirochaetes or blood filaments?

ii. The second paper describes the same outbreak but in greater detail. It is noted that the rats which visited the cages of the chimpanzees at night were found to be carriers of spirochaetes which, however, were larger and more active than those found in the chimpanzees, the animals inoculated from them, the cultures from the first author who contracted the disease and in the cultures. The chimpanzee inoculated with 3 cc. of the author's blood, in which a few rare spirochaetes were found, died in 1½ days after showing the same symptoms. The name *Spirochaeta anthropopitheci* n. sp. is suggested for the organism, the more detailed account of which does not entirely remove all doubt as to its actual nature.

C. M. W.

KLARENBECK (A.). Présence de spirochètes du type *Leptospira* dans les reins des chiens atteints d'ictère et de fièvre typhoïde. [**Leptospira in the Kidneys of Dogs with Jaundice and Typhoid Fever.**]—*Ann. Inst. Pasteur.* 1927. Nov. Vol. 41. No. 11. pp. 1156–1165. With 5 text figs. [18 refs.] [Vet. Faculty, Utrecht, & Pasteur Inst., Paris.]

—. Een leptospirose als oorzaak van icterus van den hond.—*Tijdschr. v. Diergeneesk.* 1927. Nov. 15. Vol. 54. No. 22. pp. 1041–1045. [5 refs.] English summary pp. 1045–1046. [Veterinary Med. Faculty, Univ. Utrecht.]

The paper describes an acute and fatal disease which attacks young dogs in Utrecht. The symptoms are apathy, jaundice, haemorrhage in the skin and mucosae, vomiting and passage of blood with the faeces, a normal or subnormal temperature. After death, which occurs in about a week, there is found hypertrophy and softening of the liver, degeneration of the kidneys and haemorrhages in the lungs, viscera and mucosa of the digestive tract. Sections of the kidneys of a number of dogs revealed spirochaetes in three. In the fresh blood the spirochaetes in their structure and movements resembled the leptospira of Weil's disease. They were not discovered in the urine. It was not possible to infect guineapigs from either the blood or the urine. It is concluded that the disease resembles the leptospiral jaundice described in English dogs by OKELL, DALLING and PUGH (*Vet. J.*, 1925, Vol. 81, p. 3), which, however, was transmissible to guineapigs.

In 1924 LUKES described as typhoid fever a disease of dogs in Stuttgart (*Trop. Vet. Bull.*, Vol. 13. p. 56) which he claimed was due to a spirochaete. The author has been able to examine a number of cases of this disease, the symptoms of which, like the Utrecht infections, appear to result from damage to the kidneys. In sections of these organs stained by Levaditi's silver nitrate method leptospira was demonstrated in abundance either within or on the surface of the renal epithelium. It would appear that the damage caused to the kidneys by the leptospira leads to symptoms of uraemia. Five drawings of sections of the infected kidneys are reproduced.

The second paper again describes the Utrecht disease. Mention is made of a guineapig which died 5 days after inoculation with 2 cc. of blood from a dog. In sections of the liver leptospira were demonstrated.

C. M. W.

HOFFMANN (W. H.). Zur Epidemiologie der Weilschen Krankheit. [**Epidemiology of Weil's Disease.**—*Deut. Med. Woch.* 1927. Oct. 14. Vol. 53. No. 42. pp. 1781–1782. [Finlay Lab., Habana, Cuba.]

Assuming that both yellow fever and Weil's disease are caused by leptospira which produce in both very similar pathological changes it is surprising that epidemiologically they are so different. Weil's disease occurs in small outbreaks but yellow fever in large epidemics. Even during yellow fever epidemics cases of Weil's disease occur, and they persist when the yellow fever epidemic ceases. The presence of cases of Weil's disease in association with stegomyia does not lead to further cases of yellow fever. It seems evident that Weil's disease is dependent upon the infection in rats. These facts indicate clearly that the two diseases are completely independent of one another.

C. M. W.

GAY (Douglas Merrill) & SELLARDS (Andrew Watson). **The Fate of *Leptospira icteroides* and *Leptospira icterohaemorrhagiae* in the Mosquito, *Aedes aegypti*.**—*Ann. Trop. Med. & Parasit.* 1927. Oct. 10. Vol. 21. No. 3. pp. 321–342. With 1 diagram. [19 refs.] [Harvard Med. School, Boston, Mass.]

With a view to throwing light on the relationship of *Leptospira icterohaemorrhagiae* and *L. icteroides* experiments were instituted to test the relative behaviour of these organisms in the yellow fever mosquito, *Aedes aegypti*. The two strains employed were virulent to guineapigs so that it was possible to test the survival of the leptospira in the mosquitoes not only by direct examination of the crushed mosquitoes by dark ground illumination but by inoculating them into guineapigs. Furthermore, attempts were made to transmit the organisms from guineapig to guineapig and *L. icteroides* from guineapig to three human volunteers under conditions which have been proved necessary for mosquitoes to transmit yellow fever to man. The experiments were carefully controlled, all possible fallacies being avoided, the number of mosquitoes used being adequate. The outcome of the experiments is that there was no difference between the two organisms as regards their behaviour in the mosquito, and neither was transmitted by their bites. After ingestion from the blood of infected young guineapigs, the leptospira in the mosquito diminished rapidly in numbers

in the first few days, then more slowly till they eventually disappeared. In exceptional instances they survived in small numbers for three weeks during which they retained their virulence as demonstrated by inoculation of guineapigs. They thus diminish in numbers as micro-organisms in an unsuitable host would do. The observations furnish additional proof of the identity of *L. icterohaemorrhagiae* and *L. icteroides*.

C. M. W.

SELLARDS (Andrew Watson). **The Relation between Weil's Disease and Yellow Fever.**—*Ann. Trop. Med. & Parasit.* 1927. July 22. Vol. 21. No. 2. pp. 245-259. [21 refs.] [Harvard Med. School, Boston, Mass.]

This very interesting paper reviews the present position of yellow fever in its relationship to Weil's disease and the organism *Leptospira icteroides* as the author sees it as a result of his recent serological studies. The general conclusion is that the two diseases are fundamentally different in their etiology, epidemiology and pathology. The organism *L. icteroides* is not the causative organism of yellow fever and prophylactic immunization with it can give only a false sense of protection. If the serum of a patient convalescent from an acute infectious jaundice gives a positive Pfeiffer test with leptospira, using either *L. icterohaemorrhagiae* or *L. icteroides*, then yellow fever can be excluded and a diagnosis of Weil's disease can be made with justification.

C. M. W.

PUNTONI (V.). Rapports entre *Leptospira icteroides* (Noguchi) et *Leptospira icterohaemorrhagiae* (Inada et Ido). [**Relation of *Leptospira icteroides* to *L. icterohaemorrhagiae*.**—*C.R. Soc. Biol.* 1927. May 6. Vol. 96. No. 14. pp. 1139-1141.]

———. Studio dei rapporti fra la "*Leptospira icteroides*" (Noguchi) e la "*Leptospira icterohaemorrhagiae*" (Inada ed Ido).—*Ann. d'Igiene.* 1927. May. Vol. 37. No. 5. pp. 261-273. [16 refs.]

The paper describes in detail a series of serological and cultural investigations conducted with a strain of *Leptospira icteroides* (Palmeiras) and one of *L. icterohaemorrhagiae* (Pasteur Institute, Paris). The result is that morphologically, culturally and biologically, the two cannot be differentiated.

C. M. W.

INADA (Jun). Ueber die chemische Zusammensetzung der Leber bei den experimentellen Spirochaetosen. [**Chemical Composition of the Liver in Experimental Spirochaetosis.**—*Proc. Imperial Acad. Japan.* Tokyo. 1927. Mar. Vol. 3. No. 3. pp. 175-176. [Prof. R. Inada's Med. Clinic, Imperial Univ., Tokyo.]

The author has investigated the chemical changes in the liver of guineapigs infected with *Leptospira icterohaemorrhagiae*, *L. icteroides* and *L. hebdomadis*. Similar changes are produced by all three organisms, but they are less marked in the case of the last-named.

C. M. W.

FUKUSHIMA (Banji) & HOSOYA (Seigo). **A Study on the Culture Media of Spirochaeta. The Relation between the Life Phenomenon of the Spirochaeta and the Oxygen Tension and Cysteine, and the Culture Medium of Spirochaeta pallida supplemented by Cysteine.**—*Scientific Reports Govt. Inst. Infect. Dis.* Tokyo. 1926. Vol. 5. pp. 151-169. [27 refs.]

Culture experiments were carried out with *Treponema pallidum* and various strains of *Leptospira* in order to determine whether the organisms required aerobic or anaerobic conditions. The organisms were grown in anaerobic jars in media with or without fresh animal tissue or cysteine. All the strains of leptospira including those of Weil's disease, yellow fever, "Nanuka-Yami," "Akiyami" and water grew in the jars if tissue were present. They were thus proved to be definitely aerobic. On the other hand *Treponema pallidum* was definitely anaerobic and would grow in the presence of cysteine without fresh tissue.

C. M. W.

BROWN (H. C.) & DAVIS (L. J.). **The Adhesion Phenomenon as an Aid to the Differentiation of Leptospira.**—*Brit. Jl. Experim. Path.* 1927. Oct. Vol. 8. No. 5. pp. 397-403. With 2 text figs. [16 refs.] [Wellcome Bureau of Scientific Res., London.]

It has already been shown that under the influence of specific sera trypanosomes are altered in such a way that minute particles such as blood platelets or bacteria become adherent to them. In the present paper the authors have applied the reaction, which they call the adhesion phenomenon in place of the more cumbersome and less generally applicable term thrombocytobarin, to the differentiation of strains of leptospira. Specific sera were prepared by inoculating animals with strains of water leptospira (*Leptospira biflexa*), rat leptospira (*L. icterohaemorrhagiae*) and human leptospira (*L. icterohaemorrhagiae*, *L. icteroides*, *L. hebdomadis*). The various strains fall into three groups, *L. biflexa* group, *L. icterohaemorrhagiae* group including *L. icteroides* (5 strains), and *L. hebdomadis* group. It thus appears that the water leptospira (3 strains) form a group by themselves and are distinct from those which are parasitic in rats and human beings. Of the latter the Japanese *L. hebdomadis* (1 strain) is distinct from *L. icterohaemorrhagiae* and *L. icteroides* which appear to be identical. This result is in accord with the conclusions recently reached by other investigators who have shown that serologically (agglutination, Pfeiffer's reaction, etc.) *L. icteroides* is not to be differentiated from *L. icterohaemorrhagiae*. The authors have noted that the serum of apparently normal rabbits may show the adhesion phenomenon with strains of water leptospira. It is suggested that anti-bodies have resulted from ingestion of water leptospira by the animals. The sera of 100 wild rats were examined. Of these 32 reacted positively with the human and rat strains, 4 with both these and a water strain and 7 with a water strain alone. This is in accord with the natural infection rate of rats with *L. icterohaemorrhagiae* as given by STEVENSON in London (30 per cent.) and BUCHANAN in Edinburgh (36 per cent.).

C. M. W.

KRITSCHESKY (J. L.) & LEBEDEWA (M. N.). Untersuchungen ueber die genetischen Beziehungen bei den Spirochäten vom Typus icterogenes (Leptospirae) mittels der Thrombozytobarine. [**Genetic Relations of the Leptospiras as shown by Thrombocytoharin.**]—*Ztschr. f. Immunitätsf. u. Experim. Therap.* 1927. Nov. 14. Vol. 53. No. 3-4. pp. 315-332. [15 refs.] [Educ. Commissariat, R.S.F.S.R., Moscow.]

Employing the thrombocytoharin reaction or adhesion phenomenon with various strains of leptospira—*L. ictero-haemorrhagiae*, *L. pseudo-icterogenes*, *L. hebdomadis* and *L. icteroides* the authors have found that they can be differentiated by the use of immune sera prepared in mice. The number of organisms to which platelets adhered in each preparation was estimated and, recording the results as all, nearly all, a half, a third or none, it was found that races of the same organism showed differences. Occasionally the inoculation of a mouse for the production of immune serum produced lysins which prevented the serum being used for the test as it destroyed the organisms.

C. M. W.

HERRMANN (Erika). Serologische Untersuchungen bei Spirochäten vom Typus Weil. [**Serological Researches on Spirochaetes of Weil Type.**]—*Cent. f. Bakt.* I. Abt. Orig. 1927. Vol. 104. No. 1-4. pp. 192-194. [3 refs.]

The object of the paper is to draw attention to the serological changes which can occur in strains of leptospira. Two main types can be recognized—the non-pathogenic water type and the pathogenic types from rats and human beings. Not only do these two types differ from one another serologically, but the various strains of each type show serological differences. Such, however, are not constant, as they may be altered by culture in different media or passage through animals. Thus, in testing stock cultures it was found that two pathogenic strains (Berlin and Zaandam) which were originally serologically quite distinct had now become serologically reversed in dilutions of serum in 1 in 20. Similarly a water strain (Erlangen) after maintenance in Ringer's solution had ceased to be affected by an originally specific serum. Two strains (Berlin and Holland) had been induced to grow in media containing their own specific sera. With this Berlin strain a new immune serum in the rabbit was produced which agglutinated the organism in a dilution of 1 in 20,000, whereas it affected the original strain in only 1 in 200. The original strain was agglutinated by its own serum in 1 in 32,000. In another direction similar changes occur. The water strain Erlangen was successfully inoculated to guineapigs and after several sub-inoculations produced death with characteristic lesions. On two occasions strains of leptospira were isolated from these animals (strains 221 and 144). Immune sera prepared with these were specific, showing that the two strains differed from one another while neither strain was influenced by the original Erlangen serum. Testing the influence of the sera of 150 normal wild rats on the growth of 4 water strains, 2 yellow fever strains and 9 pathogenic strains, it was found that the water strains grew well, the yellow fever strains would not grow, while the pathogenic strains refused to grow in 15 per cent. of the sera. Another series of wild rats were inoculated with a strain pathogenic to guineapigs and it was found that 15 per cent. resisted infection. This

suggests that 15 per cent. of the Freiburg rats harbour a true Weil's strain. The conclusion is reached that the serological characters of leptospira are very labile and that the production of immune sera in rabbits is too delicate to be employed as a practical means of differentiating them. Rats again are able to respond by the production of different kinds of antibody.

C. M. W.

VAN THIEL (P. H.). *Leptospira Pseudoicterogenes*.—*Nederl. Tijdschr. v. Hyg. Microbiol. en Serol.* Leyden. 1927. Vol. 2. No. 1. pp. 70-84. With 2 figs. on 1 plate. [19 refs.] [Inst of Trop. Med., Leyden.]

Experiments with cultures of water leptospira have shown that, contrary to the views expressed by KABESHIMA (this *Bulletin*, Vol. 24, p. 712), it is possible for the organisms to pass through an L_3 filter when the added control bacteria do not pass. The method was to dilute with tap water 3 cc. of a 3 days old culture in 15 per cent. serum water. After this fluid has passed through the filter a little water is allowed to pass. If this precaution is not taken a negative result may be obtained. Filtration at pressures of 20 cm. to 70 cm. applied gradually or suddenly were equally effective. By this means pure cultures were obtained while further purification was secured by commencing cultures from single individuals. This was effected as follows:—Some of the filtrate in a very much diluted culture was taken. Very small drops were spread on a slide without a cover glass, and examined by dark ground illumination with low magnification. When a drop was secured which contained only a single leptospira the fluid was sucked up with the aid of some culture fluid into a small tube which was incubated at 37° C. It was inspected after a few days. These experiments were conducted some hundreds of times, and it was noted that a culture was never obtained unless a leptospira had been seen in the original drop of fluid examined. Though the fluid always contained innumerable granules none of these was able to give rise to a culture. It would appear therefore that a filterable granule stage of leptospira is excluded. It was shown that *Leptospira icterohaemorrhagiae* was able to pass as readily through the filters as the water leptospira. So far cultures of this organism have not been commenced from a single individual. In the serum water (15 to 20 per cent.) medium the water leptospira grows more readily than the rat leptospira while the reverse is the case with Noguchi's semi-fluid agar serum haemoglobin medium. There appeared to be definite morphological differences between the two organisms as grown in these culture media. The water leptospira were uninfluenced by a Weil's disease serum, or the serum of rabbits immunized against the human and rat strains. Though the water leptospira were rendered non-motile by an anti-Weil serum this was not a specific reaction as normal serum gave the same result. The water strain though it has been cultivated for nearly two years has never shown any inclination to become pathogenic to guineapigs or mice, while it has retained its serological distinctness from the human and rat strains. It does not appear therefore that age of culture has much influence in bringing about the change to pathogenicity of an original non-pathogenic water strain as UHLENHUTH and ZUELZER, who have noted such a change, maintain. There would seem to be a possibility that, when these observers noted a change to pathogenicity of a water strain, they were

dealing with a culture which, though obtained from water, contained both a water leptospira and a rat one also owing to the water having been polluted previously by rats.

C. M. W.

WALKER (John E.). **Leptospiras from Tap Water.**—*Jl. Infect. Dis.* 1927. Aug. Vol. 41. No. 2. pp. 164–168. [7 refs.] [Army Med. School, Washington, D.C.]

The author has confirmed HINDLE's finding that a culture of leptospira can be obtained from water by adding a small particle of faeces to some of the water in a Petri dish. In about 14 days a culture is obtained. He has also found that various substances can be used in the place of faeces, viz., hay infusion, broth, milk, egg, serum and blood. It was noted that in the case of faeces no growth was obtained if this were sterilized before adding it to the water, but that if a loopful of a culture of *Bacillus coli* were mixed with it growth occurred. The water used was Washington tap water which is practically free from this organism. Very good results were obtained with the following medium: Egg yolk, 1 cc., agar, 1 gm., tap water, 300 cc. The agar was dissolved by heat and when cool enough to handle, the egg yolk was added, the mixture being shaken. The medium while still liquid was poured into Petri dishes (20 to 30 cc. each). Each dish was inoculated with about 5 cc. of another culture. For the initial culture from tap water 1 cc. yolk was added to 300 cc. of tap water and then sufficient melted agar to give a 0.3 per cent. solution. The initial culture was always inoculated with *B. coli* though this did not seem to be so necessary when egg in place of sterile faeces was added. In this medium at room temperature leptospira developed in 4 to 10 days, reaching a maximum of 10 to 100 per microscopic field in 14 days. About 50 guineapigs were inoculated with cultures of the water leptospira but no infection occurred nor was there any evidence of latent infections. When *L. icterohaemorrhagiae* and *L. icteroides* were inoculated to this medium no growth occurred though survival for 10 to 30 days occurred. Subculture invariably failed. There was thus a marked contrast between the pathogenic and non-pathogenic strains.

C. M. W.

BAUER (J. H.). **A Method for the Isolation of Leptospiras from Water.**—*Amer. Jl. Trop. Med.* 1927. May. Vol. 7. No. 3. pp. 177–179. [5 refs.]

A method is described for isolating leptospira from water in West Africa. The water is filtered through filter paper, then through a Berkefeld V and finally through a Berkefeld N filter. A quantity (200 cc.) of the filtered water is mixed with 20 cc. of 2 per cent. nutrient agar melted and cooled to 45° C. and 2 to 3 cc. of fresh defibrinated guineapig blood. The mixture is then distributed in a number of test tubes (about 7 cc. to each) and kept at room temperature (22° to 35° C.) in the dark. A visible growth as a grayish haze was clearly seen between the 6th and 10th day if leptospira was present in the water. One or more of the tubes would be found to contain pure cultures. Rabbit's blood did not give such satisfactory results.

C. M. W.

BRILL. Zur Aetiologie des Schlammfiebers. [**Aetiology of Mud Fever.**]—*Muench. Med. Woch.* 1927. Sept. 9. Vol. 74. No. 36. pp. 1537-1540. With 3 curves & with 1 text fig. in Vol. 74. No. 43. p. 1858. [9 refs.] [Med. Univ. Polyclinic, Hamburg-Eppendorf.]

The paper gives a further account of the disease "Schlammfieber" or mud fever (see this *Bulletin*, Vol. 24, p. 712). Attention is directed to the general resemblance of the malady to Weil's disease. It is stated that a spirochaete-like structure was found in the blood. It was submitted to various people who agreed as to its spirochaete nature, but thought it unlike any known spirochaete. A microphotograph of the organism given in the second note is not entirely convincing. On the assumption that the disease was spirochaetal in nature, field mice were examined and it is claimed that spirochaetes were seen in smears of the heart blood and kidneys. The suggestion is made that the disease is contracted from water which has been polluted with spirochaetes by the field mice.

C. M. W.

CARPI (Umberto). Contributo alla conoscenza della spirochetosi ittero-emorragica nostrale. [**Icterohaemorrhagic Spirochaetosis in Italy.**]—*Riforma Med.* 1927. July 25. Vol. 43. No. 30. pp. 700-704. With 1 text fig. [16 refs.] [Ospedale Maggiore, Milan.]

A description of a case of Weil's disease which was diagnosed by the infection of guineapigs inoculated with the urinary sediment of the patient.

CUSHING (E. H.). **Leptospirosis Icterohaemorrhagica.**—*Jl. Amer. Med. Assoc.* 1927. Sept. 24. Vol. 89. No. 13. pp. 1041-1043. [4 refs.] [Bellevue Hosp., New York.]

The paper describes two sporadic cases of leptospiral jaundice in the United States. The organisms were recovered by inoculation of guineapigs from the urine of both cases and from the cerebrospinal fluid of one.

CERRUTI (C.) & REITANI (V.). [Ricerca della spirocheta ittero-emorragica nei ratti di Torino.] [**Spirochaetosis Icterohaemorrhagica in the Rats of Turin.**]—*Minerva Medica.* 1926. Vol. 6. No. 20. 2 pp. [Summarized in *Bull. Inst. Pasteur.* 1927. Aug. 15. Vol. 25. No. 15. p. 678.]

A record of the failure to discover *Leptospira icterohaemorrhagiae* in 100 *Mus decumanus* captured in various parts of Turin at different times of the year.

SCHÜFFNER (W.) & SIEBURGH (G.). Over de vroegtijdige microscopische diagnose van leptospirosen (Weilsche ziekte, gele koorts e.a.). [**Early Microscopical Diagnosis of Leptospiral Infections.**]—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1926. Vol. 66. No. 6. pp. 801-806. [12 refs.]

A German version of this paper has been reviewed (this *Bulletin*, Vol. 24, p. 709).

C. M. W.

YELLOW FEVER.

- i. GOUZIEN (P.). L'endémicité de la fièvre jaune en Afrique Occidentale. [**The Endemicity of Yellow Fever in West Africa.**]—*Rev. Méd. et Hyg. Trop.* 1927. July-Aug. Vol. 19. No. 4. pp. 97-108. [7 refs.]
- ii. LEGER (Marcel). Spirochétose sanguine de l'Ouest-Africain. A propos de la communication de P. GOUZIEN sur la fièvre jaune. —*Ibid.* pp. 109-112.

i. This is a long and carefully reasoned argument in support of the view that yellow fever is actually endemic in West Africa. It was written by the first author, who has since died, as a reply to the criticisms of LAURENT (see this *Bulletin*, Vol. 24, pp. 101-103), who expressed the opinion that cases diagnosed as yellow fever in West Africa showed undoubted signs of malaria which had not been properly excluded. Attention is drawn to the probability of the disease existing in a modified form in the natives, to the possibility of the virus surviving in the mosquito during its period of hibernation, or of small mammals acting as reservoirs. A warning is issued against the confusion of yellow fever with blackwater fever, the differential features of the two diseases being emphasized. The conclusion is that yellow fever exists in French West Africa, and that it has numerous endemic foci. Its diagnosis presents no serious difficulties, but confusion with alcoholism, malaria and blackwater fever should be guarded against. Medical officers should constantly keep in mind the necessity of notifying every case of yellow fever so that all the means available for preventing the endemic disease developing into an epidemic may be immediately applied.

ii. The author of the second paper expresses his agreement with all that General GOUZIEN has written. He calls attention to the danger of giving quinine to yellow fever cases, a danger which has been generally admitted by many who have had to deal with the disease. He notes the reference to the possibility of there being a small mammal reservoir of the virus and details his own observations on the occurrence of a spirochaete of the relapsing fever type, *Spirochaeta crociduræ*, in small rodents of Dakar where relapsing fever in man occurs. The spirochaete of the rodents is inoculable to laboratory animals and to man and it would seem that the rodents may actually be playing the part of reservoir for a relapsing fever virus. If so, it has yet to be determined how the spirochaetes pass from these reservoirs to human beings and whether they represent a type distinct from those which are now well recognized.

C. M. Wenyon.

- ROUBAUD (E.). La fièvre jaune dans le monde et les méthodes modernes d'action contre ce fléau. [**Yellow Fever and Modern Methods of Combatting it.**]—*Matériaux pour l'Etude des Calamités.* 1927. Apr.-June. Vol. 4. No. 13. pp. 50-74. With 4 maps. [13 refs.]

This is an interesting account of yellow fever from the point of view of its past and present distribution throughout the world and the methods which have proved useful in its eradication.

C. M. W.

JUNIOR (Vianna). Febre amarella. [**Yellow Fever.**]—*Brasil-Medico*. 1927. June 11. Vol. 41. No. 24. pp. 578-583. [2 refs.]

The paper describes six cases of yellow fever, three of them fatal, which were treated in the Isolation Hospital of Mont Serrat, Bahia. The chief interest lies in the isolation in Noguchi's medium of a leptospira from the blood of one of the fatal cases during May, 1926.

C. M. W.

MACKENZIE (Ian). **Notes on a Case of Yellow Fever.**—*Jl. Trop. Med. & Hyg.* 1927. Sept. 1. Vol. 30. No. 17. pp. 218-219.

Details of the clinical picture and post-mortem findings in a fatal case of yellow fever seen by the author in Sierra Leone in August, 1918.

C. M. W.

FOWLER (James K.). "**West African Yellow Fever.**" [Correspondence.]—*Brit. Med. Jl.* 1927. Nov. 12. pp. 896-897.

This letter is written to call attention to an error which is sometimes made in referring to "West African Yellow Fever" as if it were a disease distinct from yellow fever. Reference is made to the paper by KLOTZ and SIMPSON reviewed below in which the authors, after the examination of tissues of thirty-five fatal cases from Nigeria and the Gold Coast, concluded that no fundamental difference was noted between the African disease and yellow fever.

C. M. W.

i. KLOTZ (Oskar) & SIMPSON (Winifred). **Jaundice and the Liver Lesions in West African Yellow Fever.**—*Amer. Jl. Trop. Med.* 1927. Sept. Vol. 7. No. 5. pp. 271-278. [9 refs.] [Dept. of Path., Univ. of Toronto, Canada.]

ii. — & —. **The Spleen in West African Yellow Fever.**—*Amer. Jl. Path.* 1927. Sept. Vol. 3. No. 5. pp. 483-488. [9 refs.] [Path. Labs., Univ. Toronto, Canada.]

i. The pathological study of material from 35 fatal cases of yellow fever from Nigeria and the Gold Coast leads the authors to conclude that no fundamental difference is to be noted between the disease as it occurs in Africa and America [a rather different conclusion to that reached by AITKEN and SMITH (this *Bulletin*, Vol. 24, p. 717)]. Yellow fever of West Africa is characterized by degenerative lesions in the liver, kidney and heart associated with haemorrhagic processes in the stomach, duodenum, skin and serous membranes and by endothelial response with degeneration in the spleen. There was variation in the fat deposits in the liver and kidneys. The authors draw attention to the fact that much of the difficulty in diagnosis of yellow fever from the point of view of the pathologist is the improper fixation of autopsy material, and the autolytic changes which progress rapidly in the damaged organs.

The lesions of greatest constancy were in the liver, so that it may be stated that yellow fever does not occur without damage to this organ. The toxin appears to have a selective action on the liver cells, which suffer degeneration and necrosis without any accompanying inflammatory process, as noted long ago by COUNCILMAN and ROCHA LIMA. They undergo an acidophilic and hyaline change, particularly in the mid-zonal region of the lobule. This change is present in some degree

in every case of yellow fever, whether jaundice occurred or did not occur during life. Though there is this intense destruction of liver cells the stroma of the lobule is unaffected, as also the vascular endothelial cells which line the sinuses of the lobules, even when the entire parenchymatous contents of the lobule are degenerated. Thus with intact sinuses, haemorrhage into the parenchymatous areas is seldom seen. Hyperplasia of the endothelial cells of the sinus, as described by SEIDELIN and TURNBULL, was noted. This affects the Kupffer cells, which may project as triangular or ellipsoid cells into the blood spaces. The Kupffer cells may show fatty degeneration which is sometimes marked. At other times they are acidophilic and granular while they may exhibit phagocytosis of red cells, lymphocytes and debris. The variation in the degree of damage to the Kupffer cells suggests an explanation of the variations in the extent of the jaundice. Though they may suffer intense degeneration and even exfoliation in the sinuses they are never completely necrotic. At the same time, there is injury to the endothelial system of the spleen and lymph nodes. It seems evident that there is serious damage to the whole reticulo-endothelial system which plays an important part in the production of bile pigment. If the liver cells are only moderately affected by the toxin there is hyperplasia of the endothelial cells which manufacture bile pigment with consequent well marked jaundice. On the other hand when early intoxication is intense and there is little or no jaundice, it is possible to demonstrate severe injury not only of the liver cells, but also of the endothelial cells which are inhibited as regards the formation of bile. When such severe cases recover, jaundice may appear during convalescence, an indication of the more early recovery of the endothelial cells. The pathology of the liver in cases of yellow fever thus lends support to the view that the reticulo-endothelial system is the important factor in bile pigment formation.

ii. In the literature dealing with the pathological changes in the internal organs in yellow fever very little reference is made to the spleen, which is usually unaltered in size and macroscopic appearance. On close examination of 35 cases from West Africa, the authors have found that the spleen suffers in a manner sufficiently distinctive to be of diagnostic value.

Microscopic study shows that the sinusoids of the pulp are widely dilated and engorged, while the pulp tissue itself shows evidence of polynuclear leucocytic infiltration only in those cases in which a hyperplasia of the endothelial cells is followed by their necrosis. The endothelial cells are crowded along the borders of the dilated sinusoids and only rarely is there evidence of their hyperplasia in the pulp areas. They show some phagocytic activity. More definite and constant changes occur in the lymphoid follicles, which macroscopically may appear either more prominent than usual or blurred and rather diffuse in their periphery. The normal follicle has a collection of endothelial cells at its centre and a sprinkling of these cells through the main lymphoid mass towards the periphery. The early reaction in cases of moderate intensity is the enlargement of the follicle brought about by hyperplasia of the endothelial cells. This is followed by diminution in size through loss of lymphocytes which disappear entirely from the spleen structure. Frequently this leads to a disappearance of many of the follicular masses in the place of which remain patches of endothelial cells, but when this stage has arrived there is evidence of endothelial degeneration.

Associated with the loss of lymphocytes from the malpighian bodies the endothelial cells in their peripheral portion and in the contiguous pulp become more prominent. They are larger and more numerous than normal, and are arranged along the border of the vascular spaces or are loosely attached to the neighbouring reticulum. Some, however, are free and show no relation to the fixed structures. These endothelial cells vary in size while some are spherical and others elongated and distorted. They are phagocytic and may show granular or hyaline degeneration. In later stages the endothelial cells at the centre of the malpighian bodies show hyaline changes and fusion of their structures. At the periphery of the bodies the degeneration is not of this type though they show a primary enlargement and granular degeneration followed by death and formation of debris. These changes often lead to the appearance of multinucleate forms and irregular fragments which are partly phagocytosed by the neighbouring reticulo-endothelium. Abnormal mitotic figures appear in some of the cells, indicating apparently a nuclear response in a degenerating cell. Furthermore the degenerating nuclei give rise to peculiar chromatin masses which may be mistaken for protozoan parasites. These changes in the spleen contrast markedly with those in the liver and kidneys where the parenchymatous cells alone suffer necrosis, the endothelial cells, though undergoing fatty degeneration, escaping complete destruction. The only reference to changes in the spleen in yellow fever similar to those described above is that of TURNBULL* who reported on two cases for the Yellow Fever Commission, in 1915.

C. M. W.

* *Yellow Fever Bureau Bulletin. Yellow Fever Commission (West Africa). Reports on Questions connected with the Investigation of Non-Malarial Fevers in West Africa.* 1915. May 29 Vol 1. pp 196-206.

MALARIA.

LEAGUE OF NATIONS. Health Organisation. **Principles and Methods of Antimalarial Measures in Europe. Second General Report of the Malaria Commission.**—95 pp. With 26 figs. (8 maps) & 3 charts. C.H./Malaria/73. 1927. July. Geneva.

JAMES (S. P.). **Problems of Malaria Prophylaxis. Conclusions of the Malaria Commission of the League of Nations.**—*Brit. Med. J.* 1927. Aug. 27. pp. 340–343. Discussion pp. 343–344. [2 refs.]

The Second General Report on the Principles and Methods of Antimalarial Measures in Europe is dedicated to Dr. Norman v. LOTHIAN, Dr. Samuel T. DARLING and Mlle. A. BESSON who died so tragically when on duty on Lebanon. The collective study tours undertaken by the Commission have for the first time enabled malariologists of different countries and of different schools of thought to study local malaria problems on the spot. Individual views have thus become modified, and the final conclusion reached is in most cases a compromise—an average opinion which probably approaches the truth.

Rarely can there be any question of converting a malarious into a non-malarious place, an alteration which can be effected only by such a complete change in the character of a site as has occurred in course of centuries in London and Rome. In the Panama Canal Zone, the locality has not been essentially altered; malaria is merely being held in check and, were protective measures to cease, it would at once become devastating. Only very exceptionally then is it wise to aim at more than a significant reduction in malaria, one, however, which will suffice to make it of little or no importance as a cause of sickness and death. As regards the means by which this may be accomplished, the startling, yet on consideration correct, statement is made that there are localities where hardly anything has retarded the effective control of malaria so much as the belief that, since mosquitoes carry the infection, the elimination of these pests should be the object of chief concern and expenditure. It is on the contrary the case that in England, the Netherlands and Denmark malaria was robbed of its importance at a time when there was no knowledge of its epidemiology and no reduction of mosquitoes, and the Commission has seen exactly the same thing in process of happening in Europe to-day.

Of the actual measures which may be employed for the lessening of malaria, there is none of which it can be said that it is the method of unquestioned choice. That selected in any instance, after adequate local inquiry, must depend on local conditions. Yet such measures do fall into two great categories designated direct and indirect, the terms being, however, used in rather special senses. The direct measures of the Commission are those which kill malaria parasites, either in man through the treatment of infected persons, or in anopheles by the destruction of malaria-infected mosquitoes in houses. In the opinion of the Commission these direct measures are primary and always indispensable; the others though often most valuable are really adjuvant. The old aim of breaking the chain somewhere is, then, replaced by the new one of killing the parasites themselves. Nor is it held advisable that too many different measures of control should be put into operation at the same time; it is better to take one or two and carry them out thoroughly, for experience has enabled the laying down

of the valuable principle that for every measure there is a "minimum effective degree of perfection"; if it be not carried out with a certain degree of thoroughness it is of no use at all.

Regarding the destruction of plasmodia in man by treatment it is pointed out that quinine, quinidine and kintum are nearly equally effective in dosage of 1 gm. daily, while cinchonine falls into the same category if the dosage be increased to 1.5 gm. Quinidine is, however, the strongest cardiac depressant. Kinetum consists almost entirely of residual alkaloidal bases, the composition of the samples issued for these tests being quinine 15, cinchonidine 35, cinchonine 25, quinidine 5, and quinoidine 20 per cent. It must be concluded then that a standard preparation of the principal alkaloids, purified only so far as to exclude the more toxic constituents, is as efficacious as quinine. This conclusion implies that the "cinchona febrifuge" of India and Java regains its old eminence, always provided that it can be standardized. It also implies that the use of these total alkaloids in place of quinine only, greatly enlarges the amount of specific antimalarial alkaloid which is at present available for world use, and should, apart from commercial rings, correspondingly cheapen the cost of treating malaria. Moreover, the demand for, and so the cost of, cinchona alkaloids will be further reduced by the Commission's further pronouncement that "prophylactic quinine" in the usual preventive doses does not prevent malaria, it merely keeps in a certain abeyance an infection which has become established. In those ways more and cheaper alkaloid will become available for use where its action is most greatly to be desired. All this implies the primary importance of diagnosis, and the Commission indicates administrative methods by which its accuracy can be forwarded.

Regarding the similar direct attack upon plasmodia in anopheles, the procedure advised starts from the fact that, at least for Europe, the majority of infected mosquitoes are found inside houses, and that it is impossible to exaggerate the importance of their destruction there. Certain hospitable housewives offer within their homes to *Anopheles maculipennis* the attractive luxuries of cobwebs, dirt, dark corners and shady cupboards. They, and those who live with them, should be brought to regard the presence of gorged, sluggish, probably infective mosquitoes in the home much as cultured people now regard the bed-bug and the louse, and to destroy them, or at least to put them to all possible discomfort by house cleaning and whitewash. Moreover, the Commission is satisfied of the usefulness of the suggestion, associated particularly with the name of ROUBAUD, that a damp dark still animal house situated between a breeding ground and the home will divert the insects to a harmless vicarious meal.

Regarding indirect antimalarial measures—during all the journeys of the Commission in different countries, only two regions have been found where large-scale antilarval measures have been definitely successful, in the Karst Mountains of Dalmatia and in parts of Palestine. In both, water is extremely scarce, strictly localized, and readily controlled. A return is made to the subject of Italian bonification, which signifies all work carried out with the object of making regions, which are periodically or permanently marshy, more suitable for agriculture and more healthy. This established value does not lie in the fact that they are essentially antilarval, indeed in many instances they actually increase, by means of their drains, the total area available for anopheline breeding. They are essentially social; they change,

that is, a poor, sparse, scattered, often seminomadic population into one settled, well-to-do, aggregated into villages with schools, doctors, water supply, proper sewage disposal, and houses of an enforced hygienic standard; and with this change malaria is lessened.

Finally the great need of continued research in malaria is made a matter of emphasis and a Section is devoted to the matter. The conveyance of malaria in the natural way by mosquitoes in this country, when infection is desired for the treatment of general paralysis, and not by the unnatural means of injection of infective blood in general use elsewhere, has enabled English workers to make certain valuable and unique observations.

These observations, together with an account of work in the Netherlands, Roumania, and Italy are embodied in the report, and the whole forms one of the most stimulating publications on malaria that has appeared in recent years.

Clayton Lane.

BOLETIN DEL INSTITUTO DE CLÍNICA QUIRÚRGICA. Buenos Aires. 1927. Vol. 3. Nos. 21-25. pp. 511-677.—VIII. **Paludismo.** [Also issued as *3a Reunión Soc. Argentina Patol. Regional del Norte, Tucumán. Julio, 7, 8 y 10, 1927.* pp. 403-584.]

One hundred and eighty pages in this large volume deal with malaria. Nelson C. DAVIS and collaborators go into the question, raised by the League of Nations Malaria Commission, and advocated by S. P. JAMES in Europe and Le PRINCE in Panama, of stressing the attack on adult mosquitoes in houses. They believe that it will be of value as a supplement to other measures, but their returns show that 183 anopheles were captured in 2,600 houses visited involving 892 hours' work. [It has apparently been overlooked that the Commission has aimed at getting the measures in houses adopted by the housewife; few communities would tolerate these domiciliary visits by outside authorities.]

An interesting case is described by SPANGENBERG of chronic malaria with a "eunuchoid" condition in a person of 26 years, the genitalia being male and undeveloped with a penis 4 cm. long and the pubic hairs of the female distribution, but the face, axilla and front of the chest were hairless; the mammae were developed, knock-knees and delicate bones present. The connexion with malaria is, naturally, difficult to establish but the case is of interest.

DOMÍNGUEZ publishes a valuable survey of the production of cinchona and quinine and points out that regarding cultivated trees the world supply of quinine comes from Java and India in the proportion of about 10 to 1, and urges that the cultivation of cinchona is for the Argentine not a problem to be studied but a work to be carried through. The plantation of cinchona on a profitable scale in its own natural home is merely a question of trial. Emilio FORTÉ considers methylene blue in quartan malaria, not as a substitute for quinine but as a drug to be used when there is "quinine resistance." Stovarsol by mouth in doses of 1 gm. daily for 4 days with 5 day intervals to a total of 16 gm. is advocated for pregnant women with tertian malaria by ETCHECOPAR, though he, as well as FORTÉ, has used the sodium salt. Dr. MAZZA and others have tried plasmochin, and plasmochin and quinine. Their conclusions are that the mixed drugs are useful in subtertian malaria, particularly against crescents, that the pure drug is effective in tertian and quartan infections and that it is without taste or secondary effects.

C. L.

MCKENZIE (A.). **The Distribution of Malaria in Dar-Es-Salaam.**—*Kenya & East African Med. Jl.* 1927. Sept. Vol. 4. No. 6. pp. 164–178. With 5 graphs & 1 map.

A spleen survey indicates that malaria is being conveyed by anopheles breeding in creeks which nearly surround Dar-Es-Salaam on the landward side. The spleen rate varied from 36.1 to 66.7 but the organ's size bore no relation to the local infection rate. The seasonal wave of malaria follows an increase in anopheline breeding, mainly it is believed in casual water near the houses of malarial patients, and it is concluded that the incidence of the disease will be favourably affected if these be controlled, even if the more permanent breeding grounds are untouched.

C. L.

SCHWETZ (Jacques). L'aspect entomologique de la lutte contre la malaria à Elisabethville. [**The Entomological Aspect of Antimalarial Measures at Elisabethville.**]—*Bruxelles-Méd.* 1927. Aug. 14. Vol. 7. No. 42. pp. 1333–1339.

The Director of the Stanleyville laboratory, having collected or reared 35 species of mosquitoes in a year at Elisabethville, the brilliant capital of Kátanga with its beautiful avenues, numerous motors and fashionable ladies, comments energetically on the fact that there is nevertheless no hygienic service there, properly so called. Mosquito breeding places are—rejected jam jars found everywhere, ditches, dug out hollows, marshes, streams and rivers.

The anopheles caught and bred are—*A. costalis*, *A. funestus*, *A. implexus* (*chrystyi*) in one spot only, *A. mauritanus*; those caught only—*A. pharoensis*, *A. wellcomei*, and *A. theileri*; and those reared only *A. maculipalpis*, *A. squamosus*, *A. pitchfordi*, *A. transvalensis*. The common ones are *A. costalis* and *A. funestus*. But [it is very significant that] although *A. funestus* has frequently been caught, it has only been bred once. [Evidently its breeding places have hitherto eluded detection.] The need of a proper, independent, health service, under a competent and energetic medical man directly responsible to the Governor is insisted upon.

C. L.

LEDENTU (G.) & VAUCEL (M.). L'index du paludisme à Brazzaville. [**Malaria Index at Brazzaville.**]—*Bull. Soc. Path. Exot.* 1927. Oct. 12. Vol. 20. No. 8. pp. 722–726. [Pasteur Inst., Brazzaville.]

At Brazzaville in French Equatorial Africa the splenic index under 5 was 19.22 (312 cases), from 5 to 10 was 18.34 (327 cases) and from 10 to 15 was 10.09 (535 cases); for the different sexes it was 12.53 for boys and 11.48 for girls. The parasite index for the same age periods was 37.16 (600 cases), 26.39 (538 cases) and 16.36 (672 cases). Amongst 475 children *P. falciparum* was present in 33.89 per cent., *P. vivax* in 50.94 per cent., *P. malariae* in 4.63 per cent. and unidentified forms in 10.5 per cent. Gametocytes were present, in plasmodium positive cases, in the following percentages: *P. falciparum* 14.9, *P. vivax* 11.15

and *P. malariae* 13.6. Of those showing parasites, 22.2 per cent. showed enlarged spleen and 77.8 per cent. showed none; while of those not showing parasites the figures were 12.6 and 84.4.

C. L.

CRAWFORD (T. S. B.). **An Outbreak of Malaria in H.M.S. Daffodil.**—*Jl. Roy. Nav. Med. Serv.* 1927. Oct. Vol. 13. No. 4. pp. 309-311.

Crawford reports 25 cases of malaria contracted at Lagos among 95 white ratings. Plague inoculation seems to have been instrumental in precipitating attacks which, it seems, were being held up by prophylactic quinine. It seems then inadvisable to stress the long incubation periods which occurred. In 20 cases diagnosis was by the microscope, the Leishman stain having to be made up fresh since otherwise it rapidly lost its staining properties.

C. L.

ROSS (Ronald). **Malaria-Control in Malaya and Assam. A Visit of Inspection, 1926-7.**—31 pp. [Ross Institute & Hosp. for Trop. Dis., Putney Heath, London, S.W.15.]

This pamphlet constitutes the report of a visit of inspection whose general expenses were met by the Indian Tea Association, and is meant for lay readers. It is not intended to contain any new scientific observations but it lays a wise emphasis on certain aspects of the malaria problem. "Both malaria and malaria-control cost money; but the former costs health and even life itself." In addition—"It would be a 'profitable charity' for planters' managers to make their coolies employ [mosquito nets]." A planter's most practical test of his expense caused by malaria is his loss of labour and the sickness in his household during the malaria season. In his visits to Gibraltar, Malaya and Assam Ross dealt with points familiar to readers of this *Bulletin*. In Calcutta he had the pleasure and satisfaction of being present when Lord Lytton, Governor of Bengal, unveiled the handsome Gate of Commemoration leading to the little laboratory in the grounds of the Calcutta General Hospital where Ross worked out in 1908 the life cycle of *Plasmodium praecox* in sparrows.

C. L.

FEDERATED MALAY STATES. **Annual Report of the Malaria Advisory Board for the Year 1926.** [HOFLIN (J. W.).]—13 pp. 1927. Kuala Lumpur.

Regarding rice fields, the same conditions favour the growing of healthy rice and the breeding of healthy mosquitoes, the latter being those which normally breed in marshes. It is felt that the danger from rice fields is less than that from marshes since the anopheles have to recolonize the fields each year. The anopheline population varies. *A. sinensis* with some *A. barbirostris* may accompany the crop; or *A. fuliginosus* may predominate in young paddy with *A. aconitus* appearing near harvest time, or again both these last may flourish just before harvest. As a larvicide in wells petrol has been used in the strength of 3 ounces to 10 square feet of area. There has been immediate destruction of all larvae at a cost of 15 cents for a well of 8 sq. ft. of surface, the

water being potable in 3 hours and unspoilt for domestic use. The Board follows the example of Social Hygiene enthusiasts and advertises in the press under, for example, the heading "Why risk it?" which advocates a daily or regular hunt in the house and garden for anopheles adults and larvae.

C. L.

BOREL (M.). Résultats d'une enquête épidémiologique et entomologique à la plantation de Gia-Nhan (Cochinchine). [**An Epidemiological and Entomological Inquiry in a Cochinchina Plantation.**]—*Bull. Soc. Path. Exot.* 1926. Oct. 13. Vol. 19. No. 8. pp. 677-680.

An account of the miserably malarious state of a plantation situated in the midst of virgin jungle in Cochin China. It employs 162 coolies, and although 45 of them are married there is not a child younger than 10 years in the place and the few children above that age are pitiful objects. The predominant parasite is *P. vivax*, which in a few instances was associated with *P. malariae* and once with *P. falciparum* also. The only Anopheles (larvae) found there were *A. maculatus* and the ubiquitous (and probably innocuous) *A. vagus*.

A. A.

UNITED STATES NAVAL MEDICAL BULLETIN. 1927. Oct. Vol. 25. No. 4. pp. 1017-1020.—**An Epidemic of Malaria at the United States Naval Station Olongapo, P.I.**

Of the 47 cases infected, 22 admitted to having been in the native city of Olongapo after sunset 2 to 3 weeks preceding the attack. The prevalent wind blew from this part to the anchored ships. The subtertian parasite was identified in 34 cases, the tertian in the rest. The latter responded to quinine promptly, the former tardily. Prophylactic quinine was not given, deliberately and after full consultation.

C. L.

MALARIACOMMISSIE VOOR NOORDHOLLAND. Jaarverslag der Wetenschappelijke Malaria-Commissie voor Noord-Holland over 1926. [**Annual Report for 1926 of the Scientific Malaria Commission for North Holland.**]—[ALDERSHOFF (H.), Chairman, KORTEWEG (P. C.), Secretary.]—35 pp. [19 refs.] 1927.

The last report, with references to former ones, is found in this *Bulletin*, Vol. 23, p. 811. In 1926 anopheles larvae were first reported on April 14th, probably a fairly normal date for Holland, since the similar dates for other years lie between April 3rd and May 4th. The first males were found in Amsterdam on June 2nd, females having as usual been found in stables throughout the whole year, smallest numbers being collected in June (53) and largest in October (2,100).

For the destruction of larvae, Paris green and paraffin have been compared. In the laboratory 10 cc. of a 1 per cent. mixture of Paris green in dust per square metre of water surface has killed all anopheles larvae, which eat it as it floats on the surface. It has no influence on pupae [which do not feed] nor on culex larvae [which are not surface feeders], nor on anopheles larvae which are put into a tank 24 hours after the application of Paris green [by which time it has sunk]. In the field

the same strength of Paris green per square metre kills all or nearly all larvae even when the spot is strongly infested. If there be a strong breeze blowing a larger quantity of the poison must be used. No ill effects were observed on fish. As regards the choice between Paris green and paraffin the former acts well in wide stretches of water with local vegetation, but since it harms neither pupae nor egg, so that small larvae are already to be found 3 days after its application, it has to be used about twice as often as paraffin—in Holland every fortnight.

The attack upon the imagines has included the destruction in Amsterdam of over 4,000,000 in stables and 2,841 in 260 houses where malaria had been present. The aim is propaganda to get householders to undertake the destruction of all mosquitoes which force their way into dwellings.

Of suspected blood films examined in Amsterdam 29 per cent. were positive, practically the same as in the previous year, and, as before, the incidence of malaria in certain medical practices is considered, while the annual admissions to provincial hospitals since 1921 are compared with those of 1901. The numbers for 1901 being 48 and for the years from 1921 onwards 11, 50, 13, 20, 36, 31.

Investigating the liability to relapse, 27 cases which had been treated for malaria in 1925 were examined by thick drop preparation in February or the beginning of March, 1926. No parasites were found, but 7 of them fell ill again with malaria in 1926, 4 of them during May, and these, it is held, may reasonably be considered as relapses. In another series of examinations a person sick with malaria in 1925 and thoroughly treated, and found negative to the thick drop on April 16th, May 14th and June 1st, fell sick with malaria on June 25th.

Regarding the value of screening, figures are given suggesting that 3 times as many infections occur among those who are unscreened as compared with those who use screened bedrooms. Regarding anopheline races the maxillary dentation does not follow the lines suggested by MARTINI.

C. L.

SLIWENSKY (M.). Die Malariafrage in Bulgarien. [**Malaria in Bulgaria.**—*Arch. f. Schiffs- u. Trop.-Hyg.* 1927. Sept. Vol. 31. No. 9. pp. 414-428.]

Long before the Great War malaria was a scourge in Bulgaria, comprising a quarter of all admissions to hospital. All three species of parasite are involved and the anopheles found are: (1) *Anopheles maculipennis* and *A. elutus*, those mostly implicated. They are found to a height of 1,400 metres [about 4,500 feet] and breed in swamps, wells and water in gardens; so that both adults and larvae are domesticated. (2) *A. bifurcatus* is very rare but occurs with *A. maculipennis* in ricefields. *A. pseudopictus* is wild, not found in houses or stables and breeding in ricefields. *A. superpictus* shares with *A. maculipennis* a wide distribution in the Struma valley corresponding with its presence in Macedonia and Thrace. The spleen rate runs as high as 50 per cent. One village, during the last ten years, has had 148 births and 250 deaths, and the yearly monetary loss to the country is estimated as 100,000,000 lei. Since the War the usual antimalarial prophylactic measures have been carried out.

C. L.

TRACHONIOTOVSKY. Le paludisme sur le territoire occupé par la République Allemande du Volga. [**Malaria in the German Republic of the Volga.**—*Russian Jl. Trop. Med.* 1927. Vol. 5. No. 7. French summary p. 469. [In Russian pp. 422-426.]

The district comprises three zones—steppe, riverine and hill. The malarial sick in 1925 and in the first eight months of 1926 were respectively per 1,000, 577.4 and 296 in the steppes, 925 and 373.5 in the riverine zone, and 201.1 and 141.6 in the hills.

C. L.

MARGINESU (P.). [Le paludisme à Sassari (Sardaigne): étude statistique et épidémiologique des années 1924, 1925 et 1926.] [**Malaria at Sassari, Sardinia.**—*L'Igiene Moderna.* 1927. June-July. Vol. 20. Nos. 6 & 7. pp. 174 & 196 [Summarized in *Bull. Office Internat. d'Hyg. Publique.* 1927. Sept. Vol. 19. No. 9. pp. 1324-1326.]

By the aid of the dispensary, "Emiciclo Garibaldi," and the application of petroleum, Paris Green and gambusia to [different parts of] the 17,000 square metres of breeding places which surround Sassari, the malarial morbidity in Sassari has fallen from 167 in 1924 to 88 in 1925 and 58 in 1926. The quarters benefiting most are those nearest to the treated breeding places, but malaria has been contracted throughout the town. The epidemic period extends from June to December or January. Parasites were found in 76.5 per cent. of cases judged to be malarial; the specific percentages among the positives being *P. vivax* 52.7, *P. falciparum* 43.1, *P. malariae* 1.8, mixed infections 2.2. The spleen rate is given only for cases diagnosed as malaria, and is not therefore comparable with that of other places.

C. L.

MISSIROLI (A.) & HACKETT (L. W.). La regressione spontanea della malaria in alcune regioni d'Italia. (**Spontaneous Regression of Malaria in some Regions of Italy.**)—*Riv. di Malariologia.* 1927. Mar.-Apr. Vol. 6. No. 2. pp. 193-243. With 6 text figs. [Refs. in footnotes.] [English summary p. 491.] [Anti-Malaria Exper. Station, Italy.]

"In four regions of Italy noted for the gradual but complete disappearance of malaria during the past century the authors, by numerous observations and experiments, have measured the extent of the contact of *A. maculipennis* with man. They confirm in general the conception of ROUBAUD and WESENBERG-LUND that the transmission of malaria has ceased because of a change in the habits of this mosquito which causes it to seek as a host stabled domestic animals to the virtual elimination of man. This change seems to be an inherited adaptation amounting to specificity in the parasitic relationship between *A. maculipennis* and domestic animals. The factors underlying such development in the habits of the insect are the great adaptability of this particular species and the progressive stability of the agricultural population which has led to the continuous stabling of the many domestic animals. In contrast with other regions, Europe has but one very domesticable anopheline, *A. maculipennis*, and the course of malaria has accompanied the stages of adaptation of this species, appearing when the mosquito began to enter

the habitations of man, and disappearing when it abandoned these for the more favourable environment of the continuously-occupied stable.

"Merely to surround human dwellings with stables or pigsties does not reproduce at once the conditions which obtain in regions of anophelism without malaria. The necessary adaptation develops *slowly*, but becomes the decisive factor in the actuation of a complete spontaneous regression of malaria."

C. L.

FALLERONI (Domenico). Per la soluzione del problema malarico italiano. (Bonifica agraria e zooprofilassi. Battaglia del grano—risicoltura). (**The Solution of the Malaria Problem in Italy.**)—*Riv. di Malariologia*. 1927. Mar.-Apr. Vol. 6. No. 2. pp. 344-409. [English summary p. 493.] [Anti-Malaria Station, Pontine Marshes.]

A. claviger [*A. maculipennis*] is a house mosquito with definite preferences and will use human habitations or animal houses according as either sort is attractive in position, numbers or conditions. It acts as a vehicle for infection just because it is domestic. It will mature its eggs up to 8 or more days after a blood feed. Zoophile races of anopheles were not observed but stress is laid on the proper siting of animal houses in human prophylaxis.

C. L.

FRANCHINI (Giuseppe). Brevi note di malariologia in provincia di Bologna. [**Notes on Malaria in Bologna Province.**]—*Arch. Ital. Sci. Med. Colon.* 1927. May. Vol. 8. No. 5. pp. 246-252. [Inst. Trop. Path., Univ. Bologna.]

This paper is mostly of local interest. In confirmation, however, of the findings of GRASSI and others that *A. pseudopictus* is a bad transmitter of malaria as compared with *A. claviger* [*maculipennis*], it is noted that in localities where malaria was endemic and least infrequent all anopheles found were *A. claviger*, where malaria was rare *A. pseudopictus* became commoner, and where it was absent their numbers were increased.

C. L.

OTTOLENGHI (D.). in collaboration with BROTZU (G.), LA FACE (L.), BRIGHENTI (D.) & ROBUSCHI (L.). Intorno all' azione esercitata dalle bonifiche sull'endemia malarica nel Ferrarese. (**On the Action of the Agrarian Sanitation Works on the Malaria Endemics of the Ferrarese.**)—*Riv. di Malariologia*. 1927. Mar.-Apr. Vol. 6. No. 2. pp. 268-343. With 10 figs. (4 maps). [Refs. in footnotes.] [English summary pp. 492-493.] [Anti-Malaria Exper. Station, Italy.]

In localities investigated *A. maculipennis*, *A. elutus*, *A. pseudopictus* and *A. bifurcatus* have been found. The first two are important but unequally distributed, the second being numerous where malaria exists,

rare or absent where malaria has disappeared. *A. clutis* appears to have the greater preference for human dwellings. No relationship was traced between malaria and social and economic conditions.

C. L.

CARR (Henry P.) & CLARKE (J. Lyell). **A Study of the Incidence and Distribution Characteristics of Malaria in Rural Areas of Southern Illinois.**—*Amer. J. Trop. Med.* 1927. July. Vol. 7. No. 4. pp. 251-268. With 2 maps. [6 refs.] [Illinois State Dept. of Pub. Health, Springfield & Intern. Health Board, Station for Field Studies in Malaria, Edenton.]

Diagnosis was primarily by examination of the spleen in the supine position with thighs sharply flexed and clothing opened, the examiner palpating the skin. Deep breathing was used. Of the 1,500 boys examined between the ages of 2 and 12, 171 had enlarged spleens, 161 or 94.1 per cent. being palpable only on inspiration; of the remaining 10, 7 were "palpable," one reached one finger's breadth and two 3-fingers' breadths below the costal margin. The situation of the home of every child examined was marked on a large scale map. The terrain consists of river valleys at a level of 300 feet to 400 feet and a more hilly region running up to 800 feet. The spleen index of the former was 14, of the latter 3.7. In two towns it stood at 4.4 and 7.3. Malaria then, it is concluded, constitutes a major public health problem in this part of the state. Even in the hilly parts it forms a not insignificant malaria rate, taking as normal the 1 per cent. London figures of ROSS, CHRISTOPHERS and PERRY. There has been found, too, a definite relationship in the same child between the occurrence of splenomegaly, and chills and fever. To the decline in malaria of recent years there is widespread testimony.

C. L.

BARBER (M. A.), KOMP (W. H. W.) & HAYNE (T. B.). **The Susceptibility to Malaria Parasites and the Relation to the Transmission of Malaria of the Species of Anopheles Common in Southern United States.**—*Public Health Rep.* 1927. Oct. 14. Vol. 42. No. 41. pp. 2487-2502. [44 refs.]

After a critical consideration of the evidence to be found in the many references cited the writers draw the following conclusions:—

"The three species of *Anopheles* common in southern United States, *A. quadrimaculatus*, *A. punctipennis* and *A. crucians*, are all easily infected with malaria parasites in the laboratory. All have been found infected in nature, *A. quadrimaculatus* and *A. crucians* with sporozoites in the salivary glands. *A. punctipennis* has been proved capable of transmitting malaria to man under laboratory conditions. *A. quadrimaculatus* is the summer species of widest distribution. It is the one most commonly found in dwellings and has been found infected in nature in higher proportion than the other species. Epidemiological evidence goes to show that it is the most important carrier of malaria in southern United States. In any antimosquito malaria control work this species should receive first attention, but we do not believe that the evidence thus far adduced can exculpate either *A. punctipennis* or *A. crucians* as possible carriers of malaria.

C. L.

DAVIS (Nelson C.), CABARROU (Félix C.) & LAINO (Fernando). Estudios entomológicos en su relación con la lucha antipalúdica. [**Entomological Investigations in Connexion with the Anti-Malarial Campaign.**].—*Bol. Inst. Clin. Quirúrg.* Buenos Aires. 1927. Vol. 3. Nos. 21-25. pp. 733-743. With 2 charts. [3 refs.] [Also issued as *3a Reunión, Soc. Argentina Patol. Regional del Norte, Tucumán, Julio, 7, 8 y 10, 1927.* pp. 625-635 & illustrations.]

These investigations were undertaken by the National Department of Hygiene of the Argentine with the help of the Rockefeller International Board of Health. The object was to find out the prevailing malaria vectors in the Northern Argentine. The result of a large number of captures went to prove that *A. pseudopunctipennis* is the chief vector, but that *A. argyritarsis* plays no part; at all events the authors' results in respect of the latter were quite negative. *A. tarsimaculatus* and *A. albitarsis*, though incriminated owing to their prevalence at certain seasons of the year and their presence in the houses, are but suspects, the case against them being not yet proven.

H. Harold Scott.

SHANNON (Raymond C.) & DEL PONTE (Eduardo). Informe preliminar sobre los anopheles transmisores del paludismo en la gobernación de Misiones. OYARZABAL (Julio). Constatación protozoológica del paludismo en la gobernación de Misiones. [**Anopheles transmitting Malaria in Misiones, Argentina.**].—*Semana Méd.* 1927. Sept. 15. Vol. 34. No. 37 (1757). pp. 695-699. With 2 charts. [1 ref.] [Bact. Inst., National Dept. of Hygiene, Buenos Aires.]

This paper deals with mosquito distribution in various localities. Dealing widely, it is noted that the carrier of malaria in North West Argentine, where the rainfall is less than 1,000 mm. and the wet season between December and June, is *A. pseudopunctipennis* breeding in running or still water, and in pools formed by the rains, exposed to the sun, with abundant algae and an alkaline reaction. In Alto Paraná the rainfall is from 1,800 to 2,000 mm.; the carriers are *A. albitarsis* and *A. tarsimaculatus*, breeding occurring probably in the dry season which follows the heavy rains, in still spring water, exposed to the sun, without algae and with an acid reaction.

C. L.

BUTLER (C. S.) & PETERSON (E.). **Malaria in Haiti.**—*U.S. Nav. Med. Bull.* 1927. Apr. Vol. 25. No. 2. pp. 278-288. With 2 charts & 7 figs. on 4 plates. [2 refs.]

This reprint from the *Journal of the American Institute of Homeopathy* tells how Haiti, by malaria and yellow fever, defeated Napoleon in 1802 and is yielding now to more appropriate methods of pressure. Malaria, apart from control measures, is proportionate to the rainfall which varies greatly. The spleen index lies between 0.88 and 100. The low lying coastal plains abound in seepage springs and are dammed for rice cultivation, and there *A. albimanus* abounds. Covered subsoil drains and rectified surface drains have produced (according to corrected tables) marked benefit to health, and much reclaimed land which has enlisted the active interest of the farmers. Work continues.

C. L.

GILL (C. A.). **The Forecasting of Malaria Epidemics with Special Reference to the Malaria Forecast for the Year 1926.**—*Indian Jl. Med. Res.* 1927. July. Vol. 15. No. 1. pp. 265–276. With 1 map. [6 refs.]

Fourteen years ago Gill entered on the task of attempting to forecast malaria epidemics, an attempt which has been condemned by a Calcutta daily paper of wide circulation—"sickness being as much psychological as physiological." Gill has remained unperturbed by the possible psychological effect of his forecast either on the plasmodium or the patient. His view, put forward in 1924, is that malaria epidemics are the outcome of "loss of equilibrium" between "infection" and "immunity." There are five factors concerned in the forecasting of an epidemic flare up of malaria during October–November in the Punjab, and they fall into the two groups as follows. "Infection" is dependent on humidity at the right season, which experience shows to be measured in the Punjab by the July–August rainfall; and on the anopheline population at the same season which in the Punjab has, however, been found to have no influence on the extent of malaria in October–November and is now ignored. "Immunity" depends on the spleen rate factor, the economic factor and the epidemic potential factor. The spleen rate factor is based on a census of 40,000 school children taken in June and November during the last 12 years. Its significance depends on the observation that epidemics of malaria of appreciable intensity never occur in localities in which the spleen rate, as compared with the previous five years, is absolutely and relatively high. It is noteworthy, then, that the spleen rate here is valued not as a measure of the risk of infection in which the community stands, but of the degree of temporary immunity which at the time it possesses. The economic factor is concerned with the average price of food grain, and the induction from analysis of statistics that economic stress may profoundly influence the magnitude of epidemic malaria. The epidemic potential factor is measured by "the co-efficient of variability of fevers" during October for the period 1868–1921. It is of value in that there is no need to anticipate an outbreak of malaria where none has occurred during 55 years, even if other factors are favourable for its occurrence. The District forecasts have had a large measure of success.

"To the writer it would appear that predictions which give a month's warning of the occurrence of an impending catastrophe are of considerable value, not only because they enable timely action to be taken to mitigate misery and distress, but because they permit of the inspiring hope that a quest embarked upon some 14 years ago is approaching its objective."

C. L.

BRUG (S. L.) & WALCH (E. W.). **Report of an Investigation of a Malarial Epidemic in Solo, 1926.**—*Meded. Dienst d. Volksgezondheid in Nederl.-Indië.* 1927. Part 3. pp. 531–579. With 2 folding plans & 8 figs. on 6 plates. [2 refs.]

A very full report is issued but with necessarily uncertain conclusions. That the outbreak was in actuality acute is indicated by a parasite index higher than the splenic index, by a close proximity between the parasite indices of adults and children and by a high percentage of crescent carriers (68 to 86 per cent. of subtertian infections); mortality reached as much as 54 per mille. The carrier was not

detected. The stomachs of about 600 anopheles and the salivary glands of 60 were examined. Only one infection was discovered, a single cyst in one stomach of an *A. rossii*. Much larger catches were, however, made in buffalo houses than in dwellings. The percentages were as follows :

	<i>A. rossii</i> .	<i>M. vaga</i> .	<i>M. aconita</i> .	<i>N. fuliginosus</i> .
Dwellings ...	35%	63%	1%	1%
Buffalo houses	3%	81%	2%	13%

Nevertheless a catch on one day "gave the surprising result that also *N. fuliginosus* appears to be sometimes a true philanthropist."

C. L.

COVELL (G.) & BAILY (J. D.). **Observations on Malaria in the Andamans; with Special Reference to the Enlarged Spleen in Adults.**—*Indian Jl. Med. Res.* 1927. Oct. Vol. 15. No. 2. pp 309–326. With 4 charts. [11 refs.] [Central Malaria Bureau, Kasauli, India.]

The splenic apex has been noted in 825 cases in adults. Its path seems to follow that in children. The highest parasite index was associated with a splenic apex about 6·8 cm. from the umbilicus and 6·2 cm. from the costal margin or one of 3 to 4 finger breadths. The findings of SCHÜFFNER and CHRISTOPHERS are confirmed, namely that gamete output is not associated with immunization, but the reverse. Quartan malaria is unusually frequent, but the degree of splenic enlargement could not be associated with any plasmodium species. It is concluded that CHRISTOPHERS' method of splenic measurement is, with modifications, applicable in the field and gives far more accurate results than do those hitherto employed, and that SINTON's method of enumerating malaria parasites by a standard suspension of fowl's blood is convenient and easy of application in field conditions.

C. L.

MACKENZIE (Ian). **A Research into the Pathology, Prophylaxis and Treatment of Subtertian Malaria.**—*Jl. Trop. Med. & Hyg.* 1927. Aug. 15. Vol. 30. No. 16. pp. 205–208.

Over a period of 9 years Mackenzie has made a detailed examination of 1,150 cases of subtertian malaria with a view to investigating quinine prophylaxis, the causes of the changes in certain organs and the biological properties of the gamete. Of 627 new arrivals in the tropics, a third was given 5 grains of quinine prophylactically, a third iron and arsenic and a third no prophylaxis. Total relapses or reinfections after 3 months were 8·2, 9·5 and 13·2 per cent. respectively. It is held that there is a marked relationship between low blood pressure, decided anaemia and localization of symptoms, that when an attack occurs during quinine prophylaxis it is apt to be more intense and to react less readily to quinine than usual, and that the prophylactic dose must be raised to 10 grains daily when infected mosquitoes are numerous. The writer has examined thousands of films and hanging drop preparations in many malaria cases and has failed to find anything suggestive of retrogressive schizogony, that is "parthenogenesis." He has obtained sporulating subtertian parasites six times on splenic puncture when only crescents were visible in the peripheral blood. The shortest

time required for the disappearance of crescents from the peripheral blood smears under quinine treatment was 5 days, the average 17.5 and the longest 28 days.

C. L.

CHODUKIN (N. J.) & LISOWA (A. I.). Zur Frage ueber die Möglichkeit von Erkrankungen an Malaria im Winter. [**The Possibility of Malarial Infection in Winter.**]—*Pensée Méd. d'Usbekistane*. Taschkent. 1927. No. 6-7. German summary pp. 132-133. [In Russian pp. 76-89. With 6 figs. on 1 plate. 9 refs.]

There are, it is believed, two kinds of hibernating *A. elutus*, one with a fat-body, really hibernating; and one without, merely surviving. In a warm room the former can become active, the fat-body shrinking and the ovary developing. The writers have shown that these hibernating mosquitoes can become infected with *P. vivax* and *P. malariae*, that ookinetes can remain in the stomach for 8 days at a temperature of 2° to 8° C. and then develop to active oocysts, that oocysts survive a temperature of 0° to 8° C. for 30 days, or one of 8° C. maintained for not longer than 20 hours, and that sporozoites can live in the salivary glands for 30 days at 0° to 8° C. They conclude that *A. elutus* hibernating in houses can infect, and that winter and spring infections are to be attributed to it.

C. L.

COOGLE (C. P.). **The Spleen Rate as a Measure of Malaria Prevalence in the United States.**—*Public Health Rep.* 1927. June 24. Vol. 42 No. 25. pp. 1683-1688. [7 refs.]

About 7,000 school children have been questioned and examined with a view to obtaining positive information or evidence regarding malarial incidence, and the point is considered under the heads of history, spleen index and parasite index. The spleen index was obtained with the child standing, bending forward and deeply breathing, the blood examination by a thick smear. The history index was positive in 1,689 of 7,143 children or 24 per cent., the maximum being 61.9 in white children in Leflore County, Miss. and the minimum 7.4 in white children in Chatham County, Ga. The spleen index in 7,108 children was 4, with a minimum of 0.2 in coloured schools in Chatham County and a maximum of 15 in coloured children in Leflore County. The parasite index in 6,103 children averaged about 7, with a minimum of 0.9 in South Carolina, the children being nearly all white, and a maximum of 29.7 in white children in Taylor County, Fla. The low infection rate is attributed to the short period of transmission (mid June to end of September), an economic status which can afford food and quinine, and to the observation that "the disease has a definite trend downward in this country, already having disappeared from large areas."

C. L.

POPOV (S. P.) & SHAPSHEV (K. N.) [**The Question of the Transmission of Malaria by Lice.**] [In Russian.]—*Profilakt. Med.* Kharkov. 1925. No. 11. Reprint 4 pp. [Summarized in *Rev. Applied Entom.* 1927. June. Vol. 15. Ser. B. Pt. 6. p. 112.]

"In view of previous observations on lice as a reservoir from which mosquitos might become infected with malaria a series of experiments

was made. The lice (*Pediculus humanus*, L.) were allowed to feed on malaria patients and were then dissected at varying intervals after feeding. It was found that at 12–15° C. the gametes ingested by the louse begin to degenerate 1 hour after feeding, and that after 3–4 hours as a rule they have all been destroyed, apparently owing to the action of digestive juices. At 37° C. degeneration occurs sooner and is completed within 3 hours."

C. L.

BROWN (F. V. Bevan) & PULLON (E. Douglas). **A Case of Malaria contracted in New Zealand.**—*New Zealand Med. Jl.* 1927. June. Vol. 26. No. 133. pp. 119–123.

A man who had not left New Zealand, except to visit Sydney and Melbourne in 1914, developed fever after visiting Auckland and occupying a bed recently vacated by a man suffering from influenza. He had, in all, 12 attacks between June, 1925, and February, 1926, characterized in general by high fever without sweating, violent dry cough without sputum, moist sounds at the bases, a patch of impaired resonance below the left scapula, nothing abnormal to X-rays, but greyish pallor during the attacks. It was a fever with 7 to 13 days intervals and 4 to 5 days duration. During the 7th attack one film showed "two bodies which might have been intra-corpuscular B.T. rings," another "malarial stippling or something very like it." Next day a *thick* film showed "typical B.T. parasites and rings." Oral quinine hydrochloride, 30 gr. for 6 days did not stop the 8th attack, which was, however, milder than usual, half the quinine being given intramuscularly as soon as the attack matured. By now the "malaria parasites had evidently lost heart" and the attacks gradually ceased. No anopheles have ever been identified in New Zealand [It is noteworthy that a *thick* film showed "typical B.T. parasites and rings."]

C. L.

LJACHOWETZKY. Ueber angeborene Malaria. [**Congenital Malaria.**]—*Cent. f. Bakt.* I. Abt. Orig. 1927. Sept. 10. Vol. 103. No. 6-8. pp. 380–390. [Pasteur Inst. of the Crimea, Simferopol.]

It seems impossible to do otherwise than consider this paper critically. Several hundred mothers and children are dealt with in a series of tables, the age of the children varying from 1 day to 2 years. The close personal postpartum conditions in which mother and infant lie are those which favour the earliest possible transmission of malaria by anopheles from mother to child. Accordingly it is not reasonable to accept any case of malaria as congenital unless the infant is found to be infected within an interval from birth which is less than the shortest known incubation period of malaria. This criterion does not seem to be indisputably present in any of the cases dealt with in this paper.

C. L.

LIPSCOMB (F. M.) & MANSELL (R. A.). **A Case of Congenital Malaria.**—*Jl. Roy. Army Med. Corps.* 1927. July. Vol. 49. No. 1. pp. 44–48. [13 refs.]

Malaria parasites (*P. vivax*) were first found in thick film in the child when 26 days old, he having been born and since resident in Murree, Northern Punjab, with an altitude of 7,200 feet, a place where acquisition of malaria has never yet been reported. The child's fever began on the third day after birth and was tertian in type for 3 attacks.

C. L.

DOROLLE (P.) & DANG-HUU-CHI. Coma palustre et grossesse. Présence de *Plasmodium praecox* dans le sang du cordon. [**Presence of *P. praecox* in the Cord Blood in Pregnancy.**—*Bull. Soc. Path. Exot.* 1927. July 13. Vol. 20. No. 7. pp. 589-591.]

A woman 5 months pregnant died comatose. A hurried autopsy showed a very large soft spleen, kidneys congested with punctiform haemorrhages and with subcapsular ecchymosis of the left, pancreas with punctiform infarcts, the uterus with retroplacental haemorrhagic foci covering a area of about a 5-franc piece and with infarcts varying in size from a pin's head to a pea. Microscopically, the spleen showed rings of *P. falciparum*, sometimes two in one corpuscle, but no forms of other age and no gametocytes; pigment was abundant, free and in leucocytes. The blood of the cord showed schizonts and sporulating bodies of *P. falciparum*, much pigment, but apparently no gametocytes—at least they are not mentioned.

The rarity of congenital malaria is noted (this case was the only one in seven examined in which the condition was present) and its existence is explained by the placental haemorrhages which existed, with their antecedent vascular ruptures.

C. L.

TATE (D. Laurence). **A Case of Ruptured Malarial Spleen : Splenectomy with Recovery.**—*Lancet.* 1927. Nov. 12. p. 1020. With 1 text fig.

An enlarged spleen was ruptured in a fall from a buggy, chiefly on to the abdomen. The man vomited, had some abdominal pain, and passed two blood-stained stools. Thirty hours later he was first seen in a collapsed state, with a rigid painful tender abdomen, the tenderness particularly in the hypochondrium and right iliac fossa. A right rectus incision had to be abandoned, on entering the peritoneum, for a large one giving access to the splenic pedicle. This was tied and the spleen removed. Plentiful salines pulled him through, and he left hospital 4 weeks later. Four weeks later still, he reported complaining, not of malaria, but of gonorrhoea.

C. L.

DOROLLE (P.) & DAN HUU CHI. Rupture spontanée de la rate au cours d'une fièvre rémittente à *Plasmodium praecox*. [**Spontaneous Rupture of the Spleen in Subtertian Fever.**—*Bull. Soc. Path. Exot.* 1927. Oct. 12. Vol. 20. No. 8. pp. 719-722. With 1 text fig. [1 ref.]

Of three prisoners shut up at night in a hospital at Hagiang, Tonkin, one died with the history that he had complained of intense cold, but never of pain. Death was from haemorrhage from an extensively ruptured spleen. *P. falciparum* was present in splenic smears.

C. L.

KARVE (S. D.). **Disorders of the Digestive System in Malaria.**—*Kenya & East African Med. Jl.* 1927. June. Vol. 4. No. 3. pp. 95-98.

Apart from nervous reactions, the disorders here considered are stomatitis, gastritis, diarrhoea and dysentery. The stomatitis is aphthous, very painful, very offensive by the fourth day, and occurs in children; the blood shows plasmodia in half the cases and clears up under quinine, "preferably by injections." Gastritis, diarrhoea and dysentery begin only when the temperature falls; the infection displayed is generally subtertian. The treatment found most effective for the last has been a combination of quinine and emetine.

C. L.

BASILE (G.). L'appendicite malarica? [**Malarial Appendicitis?**]
—*Policlínico. Sez. Prat.* 1927. Aug. 8. Vol. 34. No. 32.
p. 1143.

Commenting upon DEMJANOW'S conclusion that malaria must be accepted as causing appendicitis (this *Bulletin*, Vol. 24, p. 263) BASILE draws attention to the well-known lesions caused by malaria parasites in which inflammation has no part. It is correct to speak of malaria simulating, but not of its causing, appendicitis, peritonitis or encephalitis. This mimicry, he notes, seems first to have been recorded by FORD (*Medical Record*, 1903), again by GILLOT (*Sem. Médicale*, 1905) and next by BASILE (*Bull. d. Soc. Lanc.*, 1906). He exclaims that there has been described of recent years a malarial epididymitis.

C. L.

URCHS (O.). Die Beziehungen der Malaria zum Nervensystem.
[**Malaria in its Relations to the Nervous System.**]—*Arch. f. Schiffs-
u. Trop.-Hyg.* 1927. Aug. Vol. 31. No. 8. pp. 365-375.
[23 refs.] [Surinam Bauxite Co.'s Hosp., Moengo, Dutch Guiana.]

The cases observed fall into 3 series.

1. Damage to the peripheral nerves, including trigeminal neuralgia, associated with malaria parasites and clearing up under quinine.
2. Herpes zoster in 5 cases within 20 months associated, with parasites in 2, perhaps in 3, cases and clearing up under quinine.
3. Two fatal cases—one with blackwater fever and encephalitic foci at autopsy, the other showing leptomeningitis.

C. L.

DE VRIES (Ernst). **Nervous Complications in Pernicious Malaria.**—*China Med. Jl.* 1927. June. Vol. 41. No. 6. pp. 503-508.
[8 refs.] [Peking Union Med. Coll., Peking.]

That the condition was malarial is based on the finding of crescents on spleen puncture, and later in cutaneous blood, after repeated negative findings, when the patient came under observation 6 weeks later. The main nervous symptoms were cerebellar ataxy, intention tremor, increased reflexes, slow and slurring speech, and non-convergence of the eyes. The Wassermann reaction was negative in blood and spinal fluid.

C. L.

VITUG (W.) & IGNACIO (P.). **Clinical Mimicry in Malaria.**—*Jl. Philippine Islands Med. Assoc.* 1927. Aug. Vol. 7. No. 8. pp. 275-282. [Coll. of Med., Univ. Philippines.]

The writers cite a number of cases illustrating the well-known protean character which the symptoms of malaria may take—influenza, typhoid, dysentery, uraemia, meningitis and cholecystitis being stimulated. The last is worthy of mention.

A death occurred in a man of 34 with fever, abdominal pain, often extremely acute causing him to cry out, deep jaundice, distended rigid tender abdomen, the last two symptoms particularly evident in the right upper quadrant. Liver and spleen could not be felt; no malaria parasites were found. "Autopsy revealed a normal gall bladder and no evidence of peritonitis. Acute splenitis and hepatitis due to malaria were the principal post-mortem findings."

C. L.

TORRES (C. Magarinos) & DE AZEVEDO (A. Penna). Sur l'hépatomégalie dans le paludisme. [**Hepatomegaly in Malaria.**]—*C.R. Soc. Biol.* 1927. Nov. 18. Vol. 97. No. 31. pp. 1358-1361. [Oswaldo Cruz Inst., Rio de Janeiro.]

In the attempt to determine whether enlargement of the liver accompanying malaria is attributable to vascular alterations or to the increase in size of individual lobules, the writers have counted the number of portal spaces visible per 100 sq. mm. histological sections 6 to 8 μ thick—in acute malaria, in chronic congestions of the liver and in controls in whom the liver is apparently normal. The numbers have been, respectively, 37.7 the average of 13 cases, 44 the average of 11 cases, and 58.86 the average of 10. The portal spaces are, then, pushed further apart than normal and the lobule correspondingly increased. There is also fatty degeneration.

C. L.

MANSON-BAHR (Philip) & MAYBURY (L. M.). **The Association of Quartan Malaria with Nephritis.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1927. Aug. 31. Vol. 21. No. 2. pp. 131-134. With 1 chart in text. [6 refs.]

Two cases of quartan malaria are described in which there occurred general oedema, albuminuria 1 to 1.5 per cent. and hyaline and granular casts. Under quinine no improvement occurred so long as parasites persisted in the peripheral blood, but as soon as these were disposed of, the general and renal condition showed improvement and each patient was discharged from hospital with no evident signs or symptoms of nephritis.

C. L.

PERUMAL (M. V.). **Indigenous Cases of Malaria at High Altitudes.**—*Indian Med Gaz.* 1927. Oct. Vol. 62. No. 10. pp. 553-554.

Ten cases are reported where malaria appeared in persons who stated that they had never been at an altitude lower than 5,500 feet. Five had been in Coonoor since birth [latitude 11° 20' N.]. Eight of them harboured subtertian and six tertian parasites, so that there were four mixed infections. The quartan parasite was absent. The station consists of a series of ridges, over 6,000 feet in altitude, intersected by deep valleys running down about 500 feet. Half the cases occurred in Dhoby Ghat, where there is "continuous breeding of mosquitoes."

C. L.

KANDIAH (M.). **How to distinguish Albumen from Quinine in Mayer's Test.**—*Malayan Med. J.* 1927. Sept. Vol. 2. No. 3. p. 99. [Inst. Med. Research, Kuala Lumpur, F.M.S.]

If the upper part of a test tube containing urine which shows a precipitate to Mayer's test be heated, the precipitate due to quinine disappears on boiling—to reappear on cooling; while that caused by albumin becomes denser.

C. L.

VAN DEN BRANDEN (F.) & HENRY (E.). Nouvelle médication du paludisme par la plasmoquine. [**Treatment of Malaria by Plasmochin.**].—*Bull. Soc. Path. Exot.* 1927. Oct. 12. Vol. 20. No. 8. pp. 728-734. [7 refs.]

Plasmochin compound has been tested in three cases in which schizonts of *P. falciparum* were present and were not removed from the peripheral blood; and in two cases in which crescents were present and had disappeared after a course of treatment lasting two to four weeks or more. Regarding *P. malariae*, four cases were treated with plasmochin and one with plasmochin compound. In all of them, schizonts, segmenting forms, and gametocytes disappeared. This appears to be one of the first records of the effects of plasmochin compound on quartan malaria, the examinations being made every 6 days for 12 weeks, 12 weeks, 8 weeks, 6 days and 6 days.

C. L.

MAZZA (Salvador), FORTÉ (Emilio), ALVAREZ SOTO (Napoleón) & ARIAS ARANDA (Carlos). Nôta preliminar sobre los efectos de la plasmoquina pura y plasmoquina compuesta en el paludismo. [**The Effects of Plasmochin and Plasmochin Compound in Malaria.**].—*Prensa Méd. Argentina.* 1927. Sept. 20. Vol. 14. No. 11. pp. 446-454. [10 refs.] [Univ. of Buenos Aires.]

In this appreciative paper, it is concluded that the immediate effects of plasmochin compound (plasmochin and quinine) in subtertian malaria are superior to that of any other treatment, and that it causes the disappearance of crescents in 4 to 6 days—one case has been followed for 7 months [others for 7 days]. Plasmochin itself, in appropriate doses, is equally efficient in tertian and quartan malaria. There is an absence of taste and of disagreeable after-effects which makes the drug particularly useful for children and for patients with a quinine idiosyncrasy.

C. L.

CHEREFEDDIN. Behandlung der Malaria mit Plasmochin. [**Treatment of Malaria with Plasmochin.**].—*Arch. f. Schiffs- u. Trop.-Hyg.* 1927. Aug. Vol. 31. No. 8. p. 375.

The writer concludes after experience with three cases that the action of plasmochin on subtertian rings is stronger than is that of quinine and that on crescents it is very certain and good. In one of his cases which had four plasmochin tablets daily for 9 days, an injection of neosalvarsan and ice to the spleen produced a relapse of rings and rosettes which disappeared under a second course of plasmochin.

C. L.

ANTONELLI (Giovanni). La plasmoquina nella cura dell' infezione malarica. (**Plasmoquin in the Treatment of Malaria.**)—*Riv. di Malariologia.* 1927. Mar.-Apr. Vol. 6. No. 2. pp. 414-434. [2 refs.] [English summary p. 494.]

" ' Plasmoquin ' (a new synthetic preparation obtained from quinoline) has given satisfactory results in 33 cases of different forms of malaria, and has shown itself specifically efficacious against the different types of parasite and the febrile manifestations. But the therapeutic results

are not permanent, especially in the cases of malignant tertian fever. In several patients the medicament causes a special cyanosis and some dyspeptic troubles, which do not represent a serious complication and generally disappear with the interruption of the treatment."

C. L.

UNITED FRUIT COMPANY, BOSTON, MASS. FIFTEENTH ANNUAL REPORT MEDICAL DEPARTMENT. 1926. pp. 66-71. [3 refs.]—**Experiences with Plasmochin in Malaria. (Preliminary Reports),**

A report had been sent by Dr. Wilhelm CORDES, of Preston Hospital, Cuba, on the use of plasmochin compound. In strict rotation he placed each of 72 patients entering hospital in two lists, odd numbers getting 2 gm. [30 grains] of quinine daily; and even numbers 8 plasmochin compound tablets daily, corresponding to 1 gm. of quinine [15 grs.] and 0.08 gm. of plasmochin. Crescents disappeared from the peripheral blood in from 3-7 days of quinine and plasmochin treatment except in one case, where they persisted for 8 days; of the quinine group, 11 had crescents on discharge from hospital. Toxic symptoms developed in 4 cases, with one death, and on them a separate communication is to be issued, pending which it should not be concluded that the death was the result of the plasmochin.

C. L.

FLETCHER (William) & KANAGARAYER (K.). **Plasmochin in the Treatment of Malaria.**—*Indian Med. Gaz.* 1927. Sept. Vol. 62. No. 9. pp. 499-506. [4 refs.] [Inst. Med. Research, Kuala Lumpur, F.M.S.]

"*The Advantages and Disadvantages of Plasmochin.*"—The tastelessness of plasmochin and the absence of unpleasant symptoms after it has been swallowed, such as bitterness in the mouth, nausea, noises in the ear, deafness and amaurosis, are all points in its favour when compared with quinine. Its action in benign tertian malaria is equal to that of the cinchona alkaloids, and in quartan fever it destroys both trophozoites and gametocytes even more quickly. We have seen several cases in which relapses occurred after treatment, but the conditions under which our observations were made do not enable us to say whether they are more or less frequent than after treatment with quinine. Plasmochin appears to have the property of destroying the crescents of subtertian malaria, and this unique attribute suggests the possibility of ridding whole districts of malaria by mass treatment of the population. Unfortunately plasmochin has two great drawbacks; the first is the uncertainty of its action upon subtertian trophozoites and the second is its toxicity, which renders mass treatment impracticable. It must be administered under medical care, and those undergoing treatment should be examined daily, because toxic symptoms sometimes supervene with great suddenness. It would not be safe to issue it for sale to the general public or to supply it (as quinine is supplied in the Malay States) to police-stations and to local headmen for free distribution. It is not suitable for the treatment of gangs of labourers on railways or road-construction, where the actual administration of remedies is often in the hands of a native overseer. It is, in short, a drug more fitted for use in the hospital than for the out-patient."

These conclusions are based on the treatment of 97 patients.

C. L.

MÜHLENS (P.). Die Plasmochinbehandlung der Malaria. [**Treatment of Malaria by Plasmochin.**].—*Deut. Med. Woch.* 1927. Nov. 4 & 11. Vol. 53. Nos. 45 & 46. pp. 1891–1893; 1933–1936. [18 refs.] [Inst. for Ship & Trop. Diseases, Hamburg.]

Mühlens sums up the recent literature on plasmochin. He remarks that as originally stated plasmochin removes the schizonts of tertian and quartan malaria, and plasmodium compound [which title is apt to disguise the fact that about one gramme of quinine is being taken daily] is equally valuable for subtertian malaria schizonts and crescents. It is further stated that this prompt and certain action on the parasites implies marked clinical results and that there are fewer relapses than with quinine; that blackwater fever and cases with "quinine idiosyncrasy" should be treated by the drug, that the young and weak bear it well. While admitting, contrary to his former report [this *Bulletin*, Vol. 24, p. 266] which was to the effect that the cyanosis accompanying plasmochin was an unaesthetic vasomotor effect of a neuropathic nature, that plasmochin produces methaemoglobin, he holds that there is no more risk from this in dosage of 0.01 gm. per 10 kilos body weight, than in the case of quinine or salvarsan. He agrees with CHEREFEDDIN that with plasmochin the treatment of and fight against malaria enters on a new phase.

C. L.

MANOLOFF-SLIVEN (S.). Erfahrungen ueber die Malariabehandlung mit Plasmochin. [**Plasmochin Treatment of Malaria.**].—*Arch. f. Schiffs- u. Trop.-Hyg.* 1927. Nov. Vol. 31. No. 11. pp. 518–523. With 3 charts in text.

The report covers 7 subtertian, 2 quartan and 1 tertian case. In the subtertian cases crescents disappeared, but quinine had to be called in to clear the blood of rings. In one of them after 7 days of 0.06 gm. plasmochin daily there occurred marked abdominal pain particularly epigastric, tenesmus, with incessant desire to defaecate and collapse. In the tertian and quartan cases all forms of parasites disappeared, but the period of observation is unnoted.

C. L.

FISCHER (O.) & WEISE (W.). Ueber Wirkungen und Nebenwirkungen des Plasmochins bei der Behandlung der menschlichen Malaria. [**Action and By-Effects of Plasmochin in Treatment of Malaria.**].—*Deut. Med. Woch.* 1927. Aug. 12 & 19. Vol. 53. Nos. 33 & 34. pp. 1380–1382; 1421–1424. With 7 charts in text. [13 refs.] [Inst. for Ship & Trop. Diseases, Hamburg.]

All writers on the use of plasmochin as an antimalarial drug have noted the cyanosis which it causes. This Fischer and Weise cannot attribute to the heart, but have examined it from the point of view of methaemoglobinaemia.

Cases investigated were given 0.05 or 0.1 gm. plasmochin daily by injection for 6 or 7 days, and an after treatment which varied. In tertian and quartan malaria 0.05 gm. plasmochin was given orally twice daily for 4 consecutive days a week, the course lasting 5 weeks. In subtertian malaria, previous work having shown that relapse would very quickly follow, the after-treatment was by quinine, 1 gm. daily in 5 doses. Crescents disappeared in 2 to 7 (average 4) days, asexual

forms in 5 to 6 days, and fever in 24 to 48 hours. No relapses and no reappearance of crescents occurred within an observation period of 5 weeks, although in one case, where rings only were present at the beginning of treatment, crescents appeared on the thirteenth day.

Methaemoglobinaemia was measured in a layer of 5 per cent. blood 4 cm. thick, by which could be measured spectroscopically any quantity from 4 per cent. upwards. Of 26 patients tested daily for some weeks, methaemoglobinaemia was absent from one only, in the others it ranged from 4 to 20 per cent., the last in those getting 0.1 gm. daily in whom also "cyanosis" was so strongly marked that plasmochin had to be taken off and quinine substituted. Nevertheless the cyanosis might gradually disappear even though plasmochin was resumed. The earliest first appearance of methaemoglobinaemia was 24 hours after the first plasmochin injection and the last evidence was 10, indeed to a slight extent 12, days after the cessation of administration.

Certain experiments suggest that the greater the initial anaemia, the greater the induced methaemoglobinaemia. Investigation was then made with smaller doses of plasmochin. With a daily dose of 0.03 gm. 10 of 13 cases showed methaemoglobinaemia and with one of 0.02 gm. 7 of 17, the drug being continued for 7 days. With this dosage it is held that there is no risk; while, on the average, crescents disappear in 5 to 6 days with either daily quantity, and always within 10 days. With this small dosage schizonts, if present in the cutaneous blood, do not disappear from it, nor, it is held, is it to be expected that they should. The effect rather is that while crescents disappear rings multiply and a typical attack results which has to be cut short by quinine. The plasmochin acts, indeed, as a provocative. A case is cited where crescents were present in the blood. Under douching of the spleen, adrenalin and sunlight schizonts appeared. In spite of daily intramuscular injections of 0.02 gm. of plasmochin the attack became so serious that quinine had to be given, up to 1 gm. daily and 6 gm. in all. Crescents, however, appeared, again to disappear under plasmochin. An after treatment by quinine was begun. Two months later he relapsed with both schizonts and crescents in the blood. In yet another case crescents disappeared from the blood for 3 days under plasmochin, many schizonts persisting and quinine having also to be administered. Nevertheless crescents reappeared and persisted until, after an interval of 10 days, plasmochin was resumed. It is concluded that for the treatment of fresh attacks and for prophylaxis quinine should be combined with plasmochin.

C. L.

SLIWENSKY (M.). Der Gametenversuch mit Plasmochin in epidemiologischer Betrachtung. [**Gametes and Plasmochin: Epidemiological.**] —*Arch. f. Schiffs- u. Trop.-Hyg.* 1927. Nov. Vol. 31. No. 11. pp. 523-526.

In 81 cases treated with plasmochin compound, which means a daily dosage of plasmochin varying between 0.075 and 0.08 gm. and of quinine up to 1 gm. [15 grains], all three forms of malaria parasite were removed from the blood for 4 months when the treatment had been carried through for 6 days. There was no abdominal pain and no cyanosis, and the treatment is held to be practical and economical.

C. L.

VAD (B. G.) & MOHILE (G. B.). **The Place of Plasmochin in the Treatment of Malaria.**—*Indian Med. Gaz.* 1927. Aug. Vol. 62. No. 8. pp. 430–434. With 16 charts. [Sir J. J. Hosp., Bombay.]

The writers mention the two kinds of tablets in which the makers put up the drug plasmochin, 0.02 gm. recommended for tertian and quartan malaria and plasmochin compound containing 0.01 gm. of plasmochin and 0.125 gm. of quinine, advised for subtertian malaria and have treated all three kinds of malaria in 17 cases. They add, "all the cases under investigation were given only the tablets of the new drug and no other medicine whatever." It does not then seem clear whether they gave the simple tablets only, or acted as they say they did "according to the directions of the manufacturer" and gave the considerable doses of quinine contained in the compound tablets to subtertian cases. They have obtained very satisfactory results and add "The days of quinine are numbered. By virtue of its surpassing merits plasmochin has successfully challenged the place of quinine. Plasmochin is another triumph for German synthetic chemistry. It has no untoward or after effects." [Such enthusiasm is refreshing but scarcely borne out by the general experience.]

C. L.

HEGNER (Robert) & MANWELL (R. D.). **The Effects of Plasmochin on Bird Malaria.**—*Amer. Jl. Trop. Med.* 1927. Sept. Vol. 7. No. 5. pp. 279–285. [6 refs.] [Johns Hopkins School of Hyg., Baltimore, Md.]

"The experiments recorded above confirm and extend the results obtained by Roehl (1926) on the action of plasmochin on malaria in birds [see this *Bulletin*, Vol. 24. p. 264 5]. Daily doses of 1.5 mgm given orally are effective, but are not easily tolerated by the birds. Heavy doses of 1.0 and 0.5 mgm. given daily for five succeeding days after a single inoculation prevent acute infections but do not prevent the appearance of parasites in the blood. Similarly smaller doses of from 0.07 to 0.2 mgm. given on five successive days after parasites appeared in the blood prevented acute infections but not the continuance of parasites in the blood. Daily small doses of plasmochin (0.1 mgm) prevented the appearance of parasites in the blood of birds that were at the same time given daily inoculations of parasites. Plasmochin in doses of 0.1 mgm. for two weeks prevented the death of birds with acute infections that were deprived of large quantities of blood. The death of a bird suffering from a severe relapse was also apparently prevented by daily doses of 0.1 mgm. for two weeks. Plasmochin is thus shown to be a very effective therapeutic agent in bird malaria. It does not, however, destroy all the parasites in the body of the host and hence does not free the host from the possibility of relapse. On this account efforts should be continued to discover a drug that will destroy all of the parasites and hence prevent what is probably the greatest single factor in the spread of malaria—relapse."

C. L.

CARDAMATIS (Giovanni P.). La cura delle febbri malariche. [**Treatment of Malarial Fevers.**]—*Malariologia.* 1927. Aug. 15. Ser. 3. No. 2. pp. 21–27. [14 refs.]

This survey of the treatment of malaria follows orthodox lines and quotes largely from the opinions of others. Cardamatis's own treatment for an adult consists in the administration of 1.6 gm. [23 grs.] of quinine on the first day, divided into 2 doses given within an hour.

The subsequent daily dose for 11 days is 1.5 gm. 7 to 8 hours before the access. After a 4 days interruption a single dose of 1 gm. is given daily for 8 days. Administration is dropped for a week and resumed for two (*P. vivax*) or three (*P. falciparum* or mixed infections) months at the rate of 1 gm. daily, which may be omitted on one day in the week.

C. L.

NEVIADOMSKY (M. M.). Traitement de la malaria d'après la méthode de l'école russe. [**Treatment of Malaria after the Russian Method.**]—*Russian Jl. Trop. Med.* 1927. Vol. 5. No. 6. French summary p. 336. [In Russian pp. 333–336.]

Failure in malarial treatment is attributable either to insufficient quinization or to a perfunctory examination of the spleen. So long as splenic enlargement persists infection persists, so that the technique of palpation requires close attention. The best treatment consists in the daily administration of 1.5 gm. of quinine hydrochloride in 5 fractional doses together with 30 injections of a 2 per cent. solution of arsenate of soda. In chronic cases, and after a month's course as above indicated, give twice a day 15 to 20 drops of [? tincture of] iodine, and if splenomegaly persist repeat the whole line of treatment till it disappears.

C. L.

ROSENTHAL (Georges). L'injection sucrée de quinine, formule moderne du traitement du paludisme. [**Malarial Treatment by Quinine in Sugar Solution.**]—*Rev. Path. Comp. et Hyg. Gén.* 1927. Sept. 5–20. Vol. 27. No. 332–333. pp. 946–949. [Pasteur Inst., Paris.]

Using intravenously, in 1918, L. O. MONACO's saccharose solution for maladies other than malaria Rosenthal was struck with the way in which the veins completely escaped injury after repeated injections, and has used it as a vehicle for quinine injection, as often as 25 times in a single person.

The solution is put up in ampoules according to one or other of these formulae.

- | | | | |
|--|-----|-----|----------------|
| (a) Quinine hydrochloride or bihydrochloride | ... | ... | 0.3 gm. |
| Urethane | ... | ... | 0.3 gm. |
| Glucose solution 30 per cent., or | | | |
| Saccharose solution, 30 to 100 per cent | ... | ... | 5 cc. |
| (b) Quinine hydrochloride or bihydrochloride | ... | ... | 0.5 gm. |
| Urethane | ... | ... | 0.3 to 0.5 gm. |
| Glucose or saccharose solution as above | ... | ... | 10 cc. |

The dosage is 0.3 to 1.1 gm. daily, quinine being preferably given by mouth on alternate days.

The urethane is a quinine solvent, this last being apt to crystallize out of the hydrochloride solution unless the urethane is in quantity equal to the quinine. The 100 per cent. saccharose solution, given slowly, is preferred, but there may apparently be a nitritoid crisis if the total amount is as much as 20 cc. In diabetes, saccharose 30 per cent. should replace glucose. To avoid fainting the injection should always be given with the patient lying down. The use of two needles, one to draw the quinine into the syringe, and the other for injection,

so avoiding the presence of caustic quinine outside the needle is thought hardly necessary. The use of tincture of iodine for the skin is not insisted upon.

C. L.

BOULKINE (A. K.). Le paludisme et son traitement dans le district de Vilouisk de la République autonome de Yakoutsk. [**Malaria and its Treatment in the Vilyuisk District, Yakutsk Republic.**]—*Russian Jl. Trop. Med.* 1927. Vol. 5. No. 6. French summary p. 382. [In Russian pp. 374–381.]

The author's résumé runs somewhat as follows :—

Tertian malaria has existed so long in Vilouisk that it may be held indigenous. For the first time it has been diagnosed by the microscope. Oral administration of quinine is impossible in such an uncivilized community; besides it produces quinine-fast organisms. Intravenous medication is the only rational treatment. It should be given in doses of 0.4, 0.3, 0.2 and 0.1 gm. at intervals of 10, 15, 20 and 30 minutes [the intervals should, however, be fewer by one than the doses], and is without inconvenience. The fractional dosage produces desensitization to quinine, is economical and should be the only prophylactic measure used, since those against imagines and larvae and for draining of marshes are inapplicable to local conditions.

C. L.

DARKER (G. F.). **Tetanus following Intramuscular Injection of Quinine.** [Correspondence.]—*Lancet*. 1927. Aug. 6. p. 306. [1 ref.]

"It always seems to me that the cause of tetanus after intramuscular injection of quinine is a rusty hypodermic needle. On the west coast of Africa where tetanus spores are common I have made many injections of quinine without mishap. I have used a platinum needle and have refused steel needles, because when once damp they always go rusty inside even if kept bright on the outside.

"There is another point. Intramuscular injection of a dense solution of quinine causes a necrotic nodule in goats and I have no doubt the same is produced in human beings. I therefore use bihydrochloride of quinine, one part dissolved in eight or ten of water."

[The suggestion that bihydrochloride of quinine in 10 to 12½ per cent. solution does not cause necrosis seems to be without support. Darker exercises great care in sterilization of solutions and instruments.]

C. L.

VAN NITZEN (R.). L'action du stovarsolate de quinine sur les infections à *Plasmodium falciparum*. [**Stovarsolate of Quinine in Subtertian Malaria.**]—*Bull. Soc. Path. Exot.* 1927. Oct. 12. Vol. 20. No. 8. pp. 727–728.

Stovarsolate of quinine was given in doses of 1.5 gm. daily to 23 adults, and a sixth to a third of that dose to 8 children. Crescents disappeared from the blood in 3 to 36 days in adults and 5 to 21 days in children. On the schizonts it had much less effect. In two these disappeared more rapidly than did crescents, in two equally rapidly, and in 21 less rapidly; indeed they have persisted after 30 to 43 gm. of the stovarsolate have been taken. SEGUIN is quoted as authority for

the statement that quinine in doses of 3 to 5 ggm. per kilo destroys crescents in 30 to 50 days. Plasmochin was given to 6 adults. The doses sufficient to remove crescents were 14 to 33 tablets [each containing 0.02 gm.] in 5 to 7 days—in one case 20 days. Schizonts were uninfluenced. "Circulatory troubles" were often provoked, while the stovarsolate was well supported and without ill effects.

C. L.

RAYNAL (J.). Essais de traitement des tierces bénigne et maligne par le stovarsolate de quinine. [**Treatment of Tertian and Subtertian by Stovarsolate of Quinine.**]—*Bull. Soc. Path. Exot.* 1927. July 13. Vol. 20. No. 7. pp. 665-689. With 10 charts in text. [Refs. in footnotes.] [Michel Lévy Hosp., Marseilles.]

Four cases of tertian malaria were treated with stovarsolate of quinine in three ten-day courses of 1 gm. daily, the courses separated by five-day intervals so that the whole occupied 40 days. In 3 of them relapses occurred 15, 18 and 41 days after the cessation of the last course, while in the fourth no relapse had occurred up to 47 days. The attacks themselves were rapidly controlled by the drug. Four cases of subtertian malaria were also treated, with rapid control. Crescents disappeared in 39, 31 and 16 days. There had been no relapses in 1, 3 and 4 months, the fourth man being repatriated and lost sight of.

C. L.

SINTON (J. A.), BIRD (W.) & EATE (S. N.). **Studies in Malaria with Special Reference to Treatment. Part VI. The Treatment of Benign Tertian Malaria with Peracrina 303.**—*Indian Jl. Med. Res.* 1927. Oct. Vol. 15. No. 2. pp. 277-286. With 2 charts. [6 refs.]

Peracrina 303 in doses up to 12 pills daily has been used for 10 patients in accordance with the makers' instructions—until no parasites had been found in the blood for 15 days. In six cases this result was reached in from 37 to 93 (average 72) days with two relapses while under observation for 8 weeks. The 4 remaining cases were treated from 72 to 112 (average 87) days when the supply of the drug gave out, but in none of them had the blood been free from parasites for 15 days. Patients objected to swallowing 12 large pills daily for two or three months, there was complaint of listlessness and loss of appetite, and depression due to the uncertain length of the treatment.

C. L.

SINTON (J. A.). **Studies in Malaria with Special Reference to Treatment. Part VII. The Intravenous Injection of Sodium Stovarsol in the Treatment of Benign Tertian Malaria.**—*Indian Jl. Med. Res.* 1927. Oct. Vol. 15. No. 2. pp. 287-299. [15 refs.] [Malaria Treatment Centre, Kasauli, India.]

These experiments were carried out at Kasauli, at an altitude which experience has shown to preclude reinfection, upon British soldiers 20 to 30 years of age, who had *P. vivax* detected in the blood immediately before beginning treatment and who had previously relapsed with that infection on an average four times. They were divided into experimental and control groups, being placed in one or the other in strict rotation, there being evidently 25 in the stovarsol group. The controls

obtained cinchona alkaloid in one form or another, either as quinine, cinchonine, cinchonidine or "malarene" which last "is a standardized 'cinchona febrifuge' prepared by the Director of Agriculture (Cinchona) Madras." It is clear then that a beginning has been made in putting out a standardized cinchona febrifuge in India. The total amount of alkaloid taken in each of the 4 treatments was 77 gm. (1,190 gr.), 36.5 gm. (560 gr.), 36.5 gm. and 36.5 gm., and the number of patients in each of the 4 control groups was 26 to 28. Sodium stovarsol patients fall into 3 groups: 1 who developed jaundice after the first injection, no more being given; 10 who received 1 gm. on the first and third days; and 14 who received 1 gm. on the first and 1.5 on the third and fifth days. Relapses with parasites in the blood within 8 weeks of ceasing treatment were in the 4 control groups 75, 74.1, 81.5 and 61.5 respectively; in the two sodium stovarsol groups 100 and 86.7 per cent.

After the stovarsol, all parasites disappeared in 5 to 30 (average 19.8) hours. In the case receiving 1 injection only, parasites reappeared in 7½ hours; among the 10 receiving two, in 12 to 37 (average 20.3) days; in the 14 receiving 3 injections, there was no reappearance within 8 to 9 weeks in 2, while, among the other 12, parasites were detected (in thick film as always) in 10 to 59 (average 23.9) days.

"We followed the course of the destruction of the parasites by hourly thin films in a number of cases. Our experiments bear out Marchoux's contention that this drug has a marked action on the larger pigmented parasites in the peripheral blood. This was especially seen in one case where gametocytes, mostly female, were present in every other field of the thin film before injection and could only be found with very great difficulty at the fourth hour after injection, although ring-forms of the parasite were still present.

"The effect on the smaller forms was very curious. The first effect noted, about an hour after injection, was an increase in size of the vacuole, a thinning of the protoplasm and a deeper staining chromatin dot. At the 4th to 6th hour the protoplasm of the ring-forms had become very thinned and in many cases was broken up into fine connected strands, sometimes with a ragged, cobweb-like appearance. The vacuole, if present, was very large and the chromatin seemed to be more deeply stained than normal. Another curious finding at this period was a large number of accolé forms, and many times double and treble infections of single cells were observed, although this had not been found before injection. Many of these forms and of the surviving larger forms seemed to be distinctly extracellular in position.

"The young unpigmented forms could be found for several hours after the larger forms were no longer detectable, but they were much diminished in number. The action of the drug seemed to prevent the normal increase in size of these young forms, or else destroyed them when they got to a certain stage, so that only small forms could be found. At this period the protoplasm stained very faintly and was irregular in shape and small in amount. The chromatin retained its staining power much longer.

"The impression which we got from a study of our preparations was that the parasite was being dissolved off the surface of the cell, rather than inside the cell as stated by Marchoux (1925)."

Stovarsol produced less splenic shrinking than quinine, and is apt, perhaps by the massive destruction of parasites, to induce high fever at its first injection. This setting free of a large quantity of malarial antigen prompts the suggestion that on YORKE and MACFIE's hypothesis the immunity reaction should be greater. It is suggested that it will perhaps be found greater in fresh infections. No toxic symptoms, except the one case of jaundice, were noted.

WALKER (H. M.). **Mercurochrome 220 Soluble in the Treatment of Malaria.**—*Fifteenth Ann. Rep. Med. Dept. United Fruit Company, Boston, Mass.* 1926. pp. 60-62. [3 refs.]

The adult dose of mercurochrome was 15 cc. In two of nine cases tertian parasites disappeared. In the others a second dose was necessary—of the same size except in two in whom the first had produced marked stomatitis. In one of these seven, tertian parasites disappeared after the second dose; in three more the second dose was followed by no change in the tertian parasites present which persisted until quinine was given; in two tertian parasites disappeared but subtertian ones persisted until quinine was given. In the last quartan parasites were present and were unaffected by mercurochrome. "No cases were taken as controls, but we have kept in mind the fact, as proven in Ancon Hospital several years ago [and in the Medical College Hospital, Calcutta, at least 25 years ago], that rest in bed and an adequate diet will often result in a clinical cure with negative blood in cases of malaria, especially the tertian type."

C. L.

SPERANZA (U.). Il bismuto nella terapia della malaria. [**Bismuth in the Treatment of Malaria.**]—*Riv. di Malariologia.* 1927. May-June. Vol. 6. No. 3. pp. 573-578. [14 refs.] [English summary p. 708]. ["S. Spirito" Hosp., Rome.]

The English summary notes that bismuth, used as salbiolo in 12 severe malaria cases, is efficacious but inferior to quinine. Its use may be advantageous where quinine is not tolerated. Reference to the original shows that all but one of the cases were of subtertian malaria.

C. L.

ROSS (G. R.). **Alternative Treatment of Malignant Tertian Malaria in Quinine Susceptible Patients.**—*Jl. Trop. Med. & Hyg.* 1927. Oct. 15. Vol. 30. No. 20. pp. 257-263. [10 refs.]

Quinine, the most satisfactory anti-malarial drug, is contra-indicated in two conditions: (1) Where an idiosyncrasy to the drug exists—where, that is, there are only two factors at work, the drug and the tissue reaction to it; our dependence on quinine is such that unless there are major symptoms of intolerance quinine should be given. (2) When quinine has precipitated haemoglobinuria—where a third factor, the subtertian malaria parasite, has invariably been present. Here quinine administration during the acute attack must always be dangerous and alternative treatment is most desirable.

Regarding arsenic Ross's experience is illustrated by a case, 3 times a sufferer from blackwater fever always following quinine, treated unsuccessfully with methylarsenate of soda and novarsenobillon for a week. Haemoglobinuria immediately followed the administration of 5 grs. of quinine. Regarding mercurochrome, Ross notes that those who have used it have produced severe toxic symptoms and holds that their almost uniform unsuccess may reasonably be held to show that it has no direct ill effect on plasmodia, but that this does not exclude an effect in aiding tissue resistance which might show itself in small doses. He believes on evidence given that two or three injections of about 5 cc. of a 1 per cent. solution given during the first five days of an attack may produce an apyrexial interval with freedom from parasites

which will render quinine less likely to produce haemoglobinuria if it then be started.

Plasmochin too has been reported upon in 6 cases in which blackwater fever had previously followed quinine administration given for subtertian malaria, and in which the new drug was now administered in doses of 0.02 gm. 3 to 5 times daily. The conclusion is that while, like mercurochrome, it can effect a temporary cure, relapse almost invariably occurs. Quinine will then have to be given, the previous administration of plasmochin not having reduced nor increased the liability to haemoglobinuria. As to its effects on gametes, Ross is noncommittal, and he holds that, since confinement to bed has not in similar cases influenced these acute infections, the improvements [for instance in parasite findings] are to be attributed to the drug.

C. L.

SIMON (Italo). Della cura della malaria e di alcuni nuovi tentativi in proposito. [**Treatment of Malaria. Some New Drugs.**—*Boll. Soc. Med.-Chirurg. Pavia*. 1926. Vol. 1. (New Series). No. 6. pp. 1161-1168. [2 refs.]

On the ground that quinine has not subdued malaria—because it has not been administered with the detailed considerations held necessary, because alimentary administration is not always tolerated, because the well-known state tablets of Italy may be passed intact in the faeces, because intramuscular injection is held to necessitate administration at a particular time of day which varies from case to case, because districts are too large for the medical men in them to cover properly, because the sick give up treatment too soon, and because a certain number of sick have, it is held, an idiosyncrasy for quinine—Simon considers the range of possible alternative remedies. In the first rank he places, in this order, quinine, cinchonine, "fenocolla" as indicated by the schools of ALBERTONI and CERVELLO, methylene blue, arsenical preparations, berberine, and certain Sardinian herbs quoted as *Ayuga iwa* and *Erithraea centaurium*. There follow three other groups—the first contains quinine with certain adjuvants, the second quinine with extracts of such organs as the spleen and adrenals, and the third certain remedies whose antimalarial properties are described as clear to those who prepare them but undiscoverable by pharmacologists and therapists. The last list contains smalarina, the only one of the group which has obtained fame outside Italy; and is doubtless capable of immense extension in other malarious countries. [There are not then included the three non-cinchona drugs which are at present most before the public as antimalarial remedies, mercurochrome, stovarsol and plasmochin].

C. L.

VOROBIEW. La méthode d'Appel dans le traitement du paludisme. [**Appel's Method for the Treatment of Malaria.**—*Russian Jl. Trop. Med.* 1927. Vol. 5. No. 7. French summary p. 470. [In Russian pp. 406-414.]

Vorobiew has treated 78 malaria cases by APPEL's method* and observed them for 7 months; only 19 per cent. have relapsed. In most

* APPEL's method (1918) consists in the administration of 0.2 gm. methylene blue solution intravenously, followed 4 hours later by neosalvarsan. For details see this *Bulletin*. Vol. 11. p. 29.—[Ed.]

cases the treatment has been repeated, and in 3.5 per cent. given 3 times. With this treatment gametes disappear much more rapidly than with any other.

C. L.

LEGENDRE (F. M. A.) & CIENFUEGOS (J. M. Alvarez). Sur quelques essais de traitements nouveaux du paludisme. [**New Forms of Treatment of Malaria.**]—*Bull. Soc. Path. Exot.* 1927. June 8. Vol. 20. No. 6. pp. 456-459. [2 refs.]

These tests were carried out on general paralytics after therapeutic inoculation of malaria.

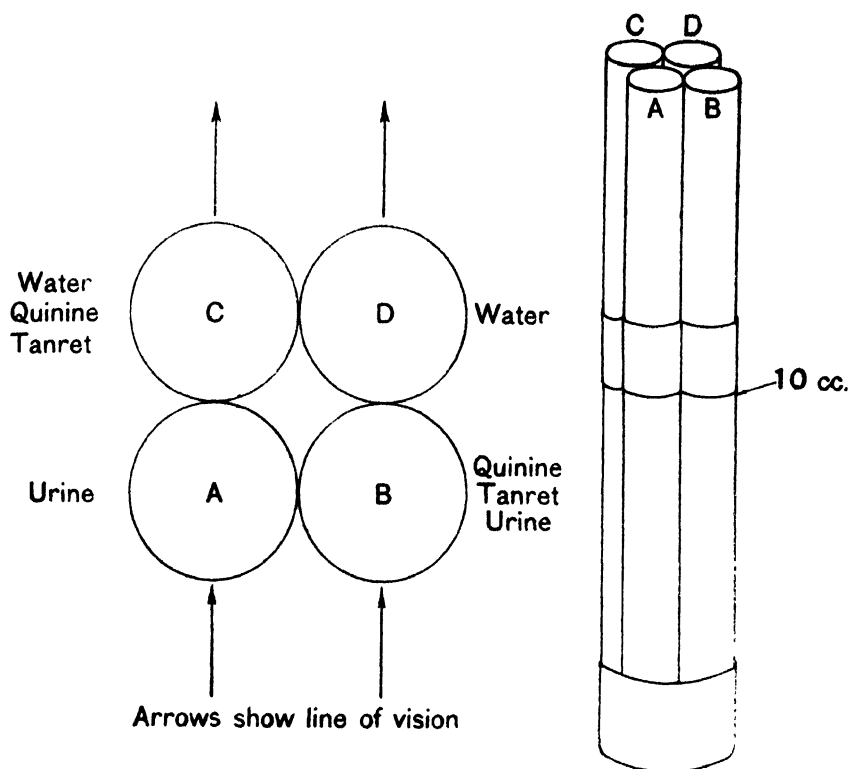
Stovarsolate of quinine 1 gm. daily. In one case of *P. vivax* infection parasites had disappeared by the third day. Treatment was continued for 5 days. There was no relapse. *P. malariae* was used in 4 cases. In one the drug was given for 8 days, the blood remaining negative over an observation period of two months; in a second for 7 days with blood parasite-free for 3 months. In the other two, infections had been induced 6 and 13 months earlier, and parasites had persisted since. Whether they were treated or not during this period is unstated. Stovarsolate of quinine caused in the one disappearance of schizonts in 2 days and of gametes in 7. In the other, who was afebrile, schizonts disappeared in 3 days and gametes in 11, the dose for the last 3 days being 1.5 gm. It is noted incidentally that in these *P. malariae* cases the spleen did not become palpable, and suggested that when this does occur there is an undetected associated tertian infection.

Nine different hydrochlorides of amino-alcohols from the Fourneau laboratory were tested without success.

C. L.

ROBINEAU (M.). Comparateur à quatre tubes pour le dosage de la quinine dans les urines, à l'aide du réactif de Tanret et d'une solution titrée de quinine. [**Determination of Quinine Content of Urine by using Four Tubes with Tanret's Reaction and a Standardized Solution of Quinine.**]—*Bull. Soc. Path. Exot.* 1927. July 13. Vol. 20. No. 7. pp. 591-595. With 2 text figs.

Robineau has described (this *Bulletin*, Vol. 23, p. 552) an apparatus by which with the aid of 30 tubes the Tanret reaction may be used to estimate the amount of quinine in the urine. A much simplified and apparently practical apparatus consists of 4 tubes clamped together and viewed in pairs, each pair containing the same constituents, the familiar arrangement used for determining the pH of liquids. The lower limit of the upper clamp marks a capacity of 10 cc. This quantity of quinine-containing urine is poured into A and B, the same quantity of water into C and D. To B and to C are added 20 drops of Tanret's solution. This solution must be in excess, and it is found that with this quantity this is the case. If there is quinine in B an opacity will be produced whose density will vary with the quantity of quinine. A one-in-five-thousand solution of quinine (estimated as base) is dropped into C, drop by drop, until an equal opacity is observed in the two pairs of tubes, the amount of quinine involved being read off from a



Simplified apparatus for determination of Quinine Content of Urine by the Tanret reaction method.

table [The two pairs of tubes are evidently strictly comparable, but there must be standardization of the drop—a pipette of fixed nozzle size and a drop not oftener than once a second—before the figures in the table can be always accurate.]

C. L.

SCHACHSUWARLY (M.). Das Verhalten des Serumbilirubins bei Malaria. [**Behaviour of Bilirubinaemia in Malaria.**—*Arch. f. Schiffs- u. Trop.-Hyg.* 1927. Sept. Vol. 31. No. 9. pp. 399-413. [54 refs.] [Inst. for Ship & Trop. Diseases, Hamburg.

The author's considerable investigations include 13 cases of tertian and 27 of subtertian malaria, 6 normal persons, and a number with various complaints. It is concluded that bilirubinaemia is increased as the result of the malarial attack, disappearing some days after it ceases; but that with latent malaria, even if parasites are present in the peripheral blood, the blood content is normal for bilirubin. Its absence, then, does not exclude latent malaria.

C. L.

MORISHITA (Kaoru), FURUTAMA (Taro) & NAMIKAWA (Hiroshi). **On the Behaviour of Urobilinogen in Chronic Malaria, with an Account of its Diagnostic Value in Malaria Prevention Work.**—*Taiwan Igakkai Zasshi (Jl. Med. Assoc. Formosa)*. 1927. Sept. No. 270. English summary pp. 9–11. [In Japanese.] [Govt. Research Inst., Formosa, Japan.]

In connexion with an attempt to establish a relationship between malarial infection and urobilinogen, the writers have examined 2,684 Japanese, Formosan Chinese, and savages. The result is tabulated thus :

Strength of reaction.	Parasite rate.	Spleen rate.	Combined parasite and spleen rate.
++	28.8	75.8	79.1
+	18.7	60.1	60.1
±	14.1	33.4	57.1
—	10.4	45.6	50
—	5.3	23.1	30.4

Moreover, the urobilinogen markedly decreased in a certain locality after two months quinization of the entire community. It is concluded that urobilinogen in the tropics is mostly due to malaria, and that those showing this condition, but no parasites, should be suspected and kept under observation.

C. L.

MORISHITA (Kaoru) & FURUTAMA (Taro). **Some Observations on the Adrenalin-Reaction in Latent Chronic Malaria.**—*Taiwan Igakkai Zasshi (Jl. Med. Assoc. Formosa)*. 1927. June. No. 267. English summary pp. 1–2. [In Japanese.] [Govt. Research Inst., Formosa.]

The investigation reported was carried out on 30 persons who showed enlarged spleen and urobilinuria, but no clinical evidence of malaria and no parasites in the blood. The adult dose of the 1 in 1,000 solution used was 0.75 cc. and the blood was then examined by thick film at intervals up to 48 hours. Parasites appeared in 3 cases (at 0.3, 1 and 2 hours respectively) in small numbers and without a febrile attack. In 15 of the negative cases further examinations up to 1 or 2 months showed the appearance of parasites in 3 cases. The number of parasites in the peripheral blood reached its maximum 5 to 90 minutes after the splenic contraction. It is suggested that the increase is the result partly of a mechanical expulsion of parasites, partly possibly biological since "the adrenalin hyperglycaemia may provide especially favourable conditions for the blood protozoa."

C. L.

NEPRJACHIN (G. G.). Zur pathologischen Anatomie des Gehirns bei Tropenmalaria. [**Morbid Anatomy of the Brain in Tropical Malaria.**]—*Frankfurter Ztschr. f. Path.* 1927. Vol. 35. No. 1. pp. 143–150. [19 refs.] [Path. Anat. Inst., Univ. Kasan.]

Neprjachin has examined the brains of 18 persons dead of malaria. The findings are practically those already fully recognized, but do not

include the "malaria granuloma" of DÜRCK and other writers, which accordingly cannot be considered as specific for malaria [see this *Bulletin*, Vol. 23, p. 626].

C. L.

WARASI (W.). Das Knochenmark bei der Malaria tropica. [**The Bone Marrow in Subtertian Malaria.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1927. Sept. Vol. 31. No. 9. pp. 435–436. [Trop. Dis. Inst., Tiflis.]

In ten cases the red marrow from the ribs was examined as smears with these findings: Myeloblasts were vacuolated in nucleus and protoplasm. Myelocytes were unaltered, but very few were eosinophil. Some macrophages took the stain poorly, others showed an intense phagocytosis of parasites, pigments and damaged erythrocytes. All megakaryocytes showed diminished protoplasm and polymorph nuclei staining poorly except for a contrary condition at their margins. The usual active karyokinesis was lessened. In 3 cases the proportion of non-infected to infected corpuscles was noted: it was as follows:—

Peripheral blood	...	6 to 1		
Brachial artery	...	59 to 1		
Vena porta	...	16 to 1		
Splenic pulp	...	7.5 to 1	48 to 1	36 to 1
Red marrow	...	23 to 1	105 to 1	61 to 1

In the bone marrow the whole schizogonic cycle can be observed. There has been seen once "parthenogenesis" of gametes, and once a grown pigmentless schizont.

C. L.

MASSA (Mario). La glicemia nella malaria. [**Glycaemia in Malaria.**]—*Pathologica.* 1927. Nov. 15. Vol. 19. No. 433. pp. 535–541. [23 refs.] [Inst. Path. & Clin. Med., Univ. Sassari.]

The writer tabulates the sugar findings in the blood in 28 malaria cases. Where fever was absent the blood sugar content was about normal. In new infections, and in relapses following a long apyretic interval, it is especially noteworthy that the sugar rises rapidly during the rigor, becoming about normal at the height of fever, and subnormal at the beginning of apyrexia. If relapses are numerous and close together the alteration in the blood sugar is insignificant.

C. L.

VAN NITSEN (R.). Réveil de la malaria par les injections de gonacrine. [**Awakening of Malaria by Gonacrine Injections.**]—*Bull. Méd. du Katanga.* 1927. Aug. Vol. 4. No. 2. pp. 47–48.

Gonacrine has been employed with varying success in the treatment of gonorrhoea in injections of 5 cc. of a 2 per cent. solution. van Nitsen describes 4 cases in which, not necessarily after the first injection, there resulted acute accesses of malaria with schizonts in the blood, which in one case was not warded off by preliminary administration of 1.5 gm. of quinine. The drug appears, then, to have a provocative value.

C. L.

MANSON-BAHR (Philip). **Researches upon the Production of Malaria Antigen for a Complement-Deviation Test.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1927. July 11. Vol. 21. No. 1. pp. 63-68. [9 refs.]

Manson-Bahr briefly reviews the efforts of THOMSON and THOMSON [this *Bulletin*, Vol. 2, p. 554; Vol. 13, p. 87] to obtain a malaria antigen by extracting cultures of malaria parasites with that excellent protoplasmic solvent, decinormal caustic soda. He attributes his own failure to obtain a satisfactory antigen by similar means to the quantities of extraneous proteids which such a solution must necessarily contain. Having in mind FAIRLEY'S work on schistosomiasis, in which this worker obtained a specific antigen from the larval stages during their non-sexual multiplication in the molluscan host, he attempted to obtain a specific malarial antigen from those multiplicatory oöcystic stages in the anopheles which follow the sexual act. Although supplied with large numbers of *A. maculipennis* by Colonel S. P. JAMES of the Ministry of Health, great difficulty was experienced in rearing from these numbers sufficiently great for insects to be always available to feed on any tertian case with sufficient gametocytes when it should at any time present itself. The development of *P. falciparum* was found to be less certain and satisfactory than that of *P. vivax* in like conditions. The best foods for the larvae were the alga *Enteromorpha intestinalis* and "Piscidin," a proprietary substance obtained from Hamburg. Nevertheless in spite of specially constructed incubators, two years' work resulted in only 26 stomachs infected with *P. vivax*.

Accordingly, attention was turned to the allied bird malaria. Two infected canaries were received from Edmond SERGENT of Algiers, but it did not prove possible to infect from these, sparrows, *Culex fatigans* or other canaries. 100 sparrows were next shipped from Bombay; 60 arrived in England, the others having apparently died of overwhelming infections. Of the survivors, 12 were sufficiently heavily infected on arrival to infect culex, although parasites had entirely disappeared a month later. Canaries inoculated from these 12 became either so heavily infected as to die or so lightly infected as to be useless for mosquito experiments, while in infected mosquitoes the number of oöcysts did not approach those produced by *P. vivax*. The antigens used were alcoholic extracts, 1 in 10, of the 26 anopheles and 24 culex stomachs which contained oöcysts. They were free from anti-complementary and haemolytic properties, but no fixation of complement occurred.

The experiments have been published in the hope that further efforts on these lines will be made where malaria and anopheles are abundant. The conditions necessary for the success, which it is believed will be achieved, are held to be the extraction of at least 100 heavily infected stomachs to every 1 cc. of absolute alcohol, preservation for a short time only, and evaporation with extraction of the residue in normal saline before use.

C. L.

HENRY (X.). [Contribution à l'étude sérologique de l'infection palustre.] [**Serological Study of Malaria.**]—*51e Congrès de l'ass. franc. pour l'avanc. des Sc., in Gaz. hebdom. Sc. méd. Bordeaux.* 1927. Vol. 48. p. 311. [Summarized in *Bull. Inst. Pasteur.* 1927. Aug. 31. Vol. 25. No. 16. p. 702.]

It appears from the abstract that 1 cc. of a 1 per cent. solution of methylarsenate of iron is added to 0.1 cc. of unheated human serum,

the mixture is shaken and incubated for $1\frac{1}{2}$ hours at 37°C ., removed from the incubator and examined half an hour later. In malarial serum [as the abstract notes, the species of plasmodium is not mentioned] there occurs flocculation. The investigation was carried out on 58 malaria cases and 85 healthy persons.

C. L.

TALIAFERRO (William H.), TALIAFERRO (Lucy Graves) & FISHER (Anna B.). **A Precipitin Test in Malaria.**—*Fifteenth Ann. Rep. Med. Dept. United Fruit Company, Boston, Mass.* 1926. pp. 48–57. [12 refs.]; also in *Jl. Preventive Med.* Baltimore. 1927. May. Vol. 1. No. 5. pp. 343–357. [11 refs.] [Univ. Chicago.]

The best antigen was obtained from malarial placenta, the pulpy part minced by machine, an equal quantity of ether added, the mixture stood for 18 days, the ether rejected, and the *insoluble* residue extracted with Coca's solution, which is water containing the following percentages of salts—sodium chloride 0.5, sodium bicarbonate 0.05, carbolic acid 0.4. This preliminary extraction with ether seemed to increase the potency of the antigen, which was obtained as a clear fluid by filtering the extract in Coca's solution through hard filter paper (Whatman's No. 5). A table is given showing that of 54 persons found infected, all but 11 by thick film, 83 per cent. were unquestionably positive, while of 32 persons in whom infection was not discovered, although a thick film was used in 4 only, 78 per cent. were unquestionably negative, and it would be surprising were not some of these, in whom no parasites were thus detected, really infective. In 6 of those positive to a presumably pure subtertian antigen, only tertian infection was discovered, and in 4 of them the reaction was very marked. The test was carried out thus—The tubes had a length of 50 mm. and a bore of 4 mm. The solution of antigen and of undiluted patient's serum were used, each to the extent of 0.15 cc. that which was the heavier, generally the serum, being placed by pipette at the bottom of the tube, and the lighter one carefully placed above it without mixing. They are incubated at 37°C . for an hour, and then placed in the ice box for 6 to 9 hours. A ring of precipitate appears at the junction of the two fluids in positive cases. "Some results indicate that efficient antigens can be prepared from infected red blood cells, provided they have a preliminary extraction with ether. All of the data indicate that the precipitation is a specific antigen-antibody reaction, and not a non-specific flocculation."

C. L.

STEPHENS (J. W. W.) & OWEN (D. Uvedale). *Plasmodium ovale.*—*Ann. Trop. Med. & Parasit.* 1927. July 22. Vol. 21. No. 2. pp. 293–302. With 28 figs. on 2 plates (1 coloured). [12 refs.]

Another case of *P. ovale* is reported, this time from Nigeria, the coloured plates which accompanied the original report of the case from East Africa being reproduced. The red cell is often regularly or irregularly oval, often with decolourization, and with stippling less marked than with *P. vivax*. The parasites are not amoeboid but round or oval, with coarse dark abundant, often yellowish brown pigment; spores are large, with 14 as a maximum number. When they are 8 or 10 they form a regular daisy with central pigment and completely fill the red cell, strikingly resembling quartan. Equatorial forms and

multiple infections are rare. Gametocytes resemble those of quartan malaria in a stippled cell with decolourized margin. The periodicity remains undetermined. The writers are unable to identify *P. ovale* with *P. vivax minutum* Emin.

C. L.

PAWAN (J. L.). **The Relative Number of Male and Female Crescents in the Peripheral Blood.**—*Ann. Trop. Med. & Parasit.* 1927. July 22. Vol. 21. No. 2. pp. 135–136. [1 ref.]

Among 3,304 crescents examined during five consecutive days the percentage of females varied from 68 to 80 with an average of 75. The sex of 3.5 per cent. could not be determined.

C. L.

PEWNY (Walther). Ueber Malariakulturen. [**Cultivation of Malaria Parasites.**]—*Wien. Klin. Woch.* 1927. Oct. 27. Vol. 40. No. 43. p. 1358.

It appears that HORNS and KAUDERS, at a meeting of the Association of Medical Men in Vienna [Gesellschaft der Ärzte], stated that in culture the tertian parasite tended to form gametocytes. Pewnny writes that during the war he worked in Albania in No. 58 Field Laboratory on this point. He modified Bass's medium and used 1 cc. of dextrose broth, 0.2 cc. of inactivated serum and 1 cc. of infected red corpuscles, cultured at 37° C. and found that subtertian rings developed to crescents, the beginning of crescent formation being already evident in the fifth hour. Development was hastened by addition of 0.1 cc. of a 3 per cent. solution of hydrogen peroxide, while the addition of glycerine was harmful. Living forms were still evident on the 17th day. Gametocytes are then formed in culture both by tertian and subtertian parasites. [SINTON (this *Bulletin*, Vol. 23, p. 814) reported crescents alone as being present in a culture overlooked for 10 days.]

C. L.

WAGNER-JAUREGG (Julius). Die Impfmalaria an der Wiener psychiatrischen Klinik. [**Inoculation Malaria at Vienna.**]—*Wien. Klin. Woch.* 1927. Sept. 8. Vol. 40. No. 36. pp. 1121–1122.

The originator of the malaria treatment for general paralysis sums up part of his experience. This treatment is withheld only in cases of galloping paralysis. Mortality has almost ceased; the proper dosage, that is, has been determined. Attacks are usually limited to 8, rarely exceed 10. Cardiac tonics and nervous sedatives are administered. If there is danger, a small dose of quinine is given and, if that does not lessen fever, this is broken off by a full quinine treatment; and an injection of malaria is repeated a few weeks later. Indeed in grave cases only 2 or 4 malarial attacks are allowed before giving quinine, neosalvarsan follows for some weeks, malaria is reinjected and allowed to run to 4 to 6 further attacks. If the first malarial course has not effected full benefit, a second is given with full and lasting advantage. There is at first no parallelism between changes in the serum and cerebrospinal fluid and the clinical improvement, but in cases which remain free from mental relapse these findings have become normal in 2 or 3 years. It is, however, advised that if a lumbar puncture does not show

normal conditions within a year at most, a second malarial injection should be given. As a rule this renders the fluid normal. Neosalvarsan to the extent of 3.15 to 4.95 gm. should follow every malarial treatment. The malaria has, in 2,000 cases, invariably been cured by 5 gm. of quinine given within one week and it is given whether malaria has aborted or not.

C. L.

PLEHN (A.). Die Behandlung der progressiven Paralyse mit Malaria tropica. [**Treatment of G.P. with Subtertian Malaria.**].—*Med. Klin.* 1927. July 15. Vol. 23. No. 28 (1179). pp. 1061-1062.

Plehn's reasoned standpoint is as follows. It is not to be expected that a second tertian malarial infection will benefit a general paralytic. Something else must be found or he must be left to his fate. Since an attack of tertian does not protect from one of subtertian malaria, the latter should at least be borne in mind in this respect; and it is believed that with certain precautions it may be used with a safety which in the circumstances is reasonably sufficient, for he has employed it in 50 cases with one death. In Germany the danger of subtertian malaria seems to lie essentially in the primary attack. This must be closely watched with blood examination at least once daily. If this examination shows 10 per cent. of the red corpuscles infected a second is made 8 to 10 hours later, and if the percentage has not lessened, quinine is given. The giving of half a gram of quinine may have no effect. It may on the other hand cause disappearance of the parasites. In the latter case there has followed, in Germany, a relapse in about 18 days, reasonably controllable and it has been the case that the febrile attacks have been stronger than with the tertian parasite. Moreover a second infection with subtertian malaria has the less violent characters associated with relapses of the primary one. It is, then, concluded that when tertian malaria fails it is justifiable to use the subtertian form.

C. L.

KIRSCHBAUM (W.). Weitere Beobachtungen zur Klinik und Parasitologie künstlicher Malariainfektionen. [**Symptoms and Parasitology in Artificial Malaria Infection.**].—*Arch. f. Schiffs- u. Trop.-Hyg.* 1927. Aug. Vol. 31. No. 8. pp. 349-365. With 4 figs. in text. [12 refs.] [State Hosp., Friedrichsberg-Hamburg.]

This useful summary and confirmation of the work of others brings out the following points. The incubation of quartan malaria (after injection of infective blood) is longer than of tertian, namely 4 to 10 days after intravenous and 21 days after subcutaneous injection, and after a second or third infection the incubation period is longer than after a first. Spontaneous disappearance of tertian malaria occurs in 10 per cent. of first infections and 77.3 per cent. of reinfections, a condition held to be exceeded in natural infections. That spontaneous disappearance does not imply complete immunity is shown by the not infrequent appearance of relapse. Tertian injected malaria has, generally, in first infections a prodromal fever, in reinfections generally none, this being absent in quartan infections also. After a second or third infection a resistance to tertian infection appears, which, according to JAMES and SHUTE, does not withstand a mosquito infection. Natural resistance to injected malaria is not established for Germans. Strains

of tertian malaria of varying origins have the same clinical effects, although the individual reactions may greatly vary, and a resistance acquired to one strain holds against others. The differences which quinine shows in different individuals are an indication of differing resistance to the tertian parasite. Prophylactic doses of quinine given before injection are useless; and a case is cited where daily "subcutaneous" injections of 0.3 gm. [5 gr.] of quinine were given for 40 days after subcutaneous injection of 4 cc. of tertian infected blood with the outbreak of frank tertian malaria 14 days after the cessation of this treatment. Quinine hydrochloride in dosage of 0.25 gm. may inhibit the fever for a time.

C. L.

KAUDERS (O.). Immunitätsstudien bei Impfmalaria. [**Immunity Studies in Inoculation Malaria.**]—*Cent. f. Bakt. I. Abt. Orig.* 1927. Vol. 104. No. 1-4. pp. 158-160.

It is established that to induce a second malarial infection repeated injections may be required. If it is effected, the incubation period is prolonged, the infection tends to die out after 4 or 5 attacks, and it may or may not be provokable. Is this the result of immunity? Kauders has given to 12 cases of malaria either 1 or 2 injections of 1 to 2 cc of the serum of a patient in which infection has died out—refractory serum. In three there was no effect, in nine there was. In five the fever disappeared and could not be provoked nor did it spontaneously return. Serum from normal persons, or from those actually suffering from a malarial attack, was without result. On the other hand a series of 7 to 9 similar injections given to a person before malarial blood was injected did not prevent infection. Indeed the incubation period was strikingly shortened. In a third series, malarial blood was injected and also some 8 injections of refractory serum given—one such case has had 12 subsequent malarial injections and a number of provocative injections, but has had no malaria within the 5 months' observation period. Three cases ran a normal course, in two the malarial attacks numbered 4 and 5 and then disappeared; and a second injected infection behaved similarly.

Kauders has also investigated malarial blood cultures using half per cent. sodium citrate solution, defibrinated blood and blood agar, blood mixed with gelatin as 1 to 5, clotted blood, defibrinated blood and examined them every 12 hours. In all 5 conditions parasites became extra globular after 12 hours and extraordinarily like gametes. In some cases gametes are identifiable, and after 88 hours only gamete-like forms are to be found, although in degenerate state. It is pointed out that a pure culture of gametes would settle the question of "parthenogenesis."

C. L.

WILLIAMS (R. G.). **The Functions of the Liver as affected by Malaria induced in General Paralytics.**—*Lancet.* 1927. Nov. 19. pp. 1071-1073. With 4 text figs.

Laevulose tolerance curves were carried out on 16 general paralytics and one tabetic under tertian malaria treatment, on 4 cases of gross liver disease (two of cirrhosis confirmed at autopsy, one of acute yellow atrophy and one of secondary malignant growths) and 6 general

paralytics untreated by malaria. The van den Bergh test seemed less sensitive than that of laevulose tolerance. The liver function was found to be much more severely affected in malaria than in the other conditions investigated, and it is concluded that the laevulose tolerance test, carried out in series, satisfactorily estimates liver derangement, and is useful in controlling therapeutic malaria.

C. L.

WETHMAR (Rudolf). Blutgruppen und Impf-Malaria. [**Blood Grouping and Inoculation Malaria.**]—*Klin. Woch.* 1927. Oct. 8. Vol. 6. No. 41. pp. 1947-1948. [4 refs.] [Wittenauer Sanatorium & "Robert Koch" Inst., Berlin.]

In the matter of connexion between blood groups and the transmission of injected malaria, which has been attracting attention in Austria, Wethmar has determined the grouping of donor and recipient in 65 cases. With intravenous injection in cases where the two fell in favourable, or compatible, groups there was an average incubation period of 4.5 days, the type of fever was double in 46 per cent., single in 27 per cent. and mixed in 27 per cent.; while with unfavourable groups the figures were 8.2 days, 6 per cent., 82 per cent. and 12 per cent. With intracutaneous injection and favourable grouping the incubation period was 9.8 days, and the type of fever was double, single and mixed in 13, 67 and 20 per cent.; while with unfavourable grouping the figures were 15.1, 8, 92 and 0 per cent. Moreover the incubation period of those with favourable groups took an uneventful course while that of those falling in unfavourable groups was sometimes (9 of 28 cases) marked by occasional shivering and a rise of temperature.

C. L.

RUBASCHKIN (W.), MOLDAWSKAJA (W.) & PAULI (S.). Blutgruppen und Malaria. [**Blood Groups and Malaria.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1927. July. Vol. 31. No. 7. pp. 329-339. [1 ref.] [Ukraine Protoz. Inst. Kharkov.]

The writers' conclusions are that the agglutination of red corpuscles is increased in malaria particularly during fever and falls with the temperature curve. The rise in the agglutination curve during incubation foreshadows an acute attack. Variation in the possibility of agglutination of red cells of group AB. (IV) affects only one of the two agglutinogens.

C. L.

STUART (M. A.). **Measures of Outstanding Importance in the Prevention and Control of Malaria.**—*U.S. Nav. Med. Bull.* 1927. Oct. Vol. 25. No. 4. pp. 996-1010. [9 refs.]

This is a résumé for the benefit of U.S. Naval Medical Officers of recent work on malaria familiar to readers of this *Bulletin*. One paragraph deals with work of DARLING which is perhaps not widely known.

"In general, the effect of an irritating, toxic, or otherwise unusual fluid on mosquito larvae is to hasten pupation. A number of experiments were tried with sea water, salt water, and solutions of the heavy metals, and in most instances, in the more concentrated solutions, when the larvae were not killed within 24 hours, they pupated, and occasionally the period of pupation was shortened; so that if, for instance, sea water were used

as a larvicide, the first effect would be to hasten pupation, and thus increase the number of anopheles in a district, and if later the sea water became diluted by rain, several species of malaria-transmitting anopheles might breed in it without difficulty, notably *A. albimanus* and *A. tarsimaculatus*. On this account sea water could not be used with any degree of success as a larvicide for anophelines, except in large quantities and in certain locations."

C. L.

CARDAMATIS (Jean P.). Compte rendu sur notre activité pendant la mission de l'été 1926 pour la restriction du paludisme en Thrace et Macedoine. [**The Mission of Summer, 1926, for the Restriction of Malaria in Thrace and Macedonia.**]—*Grèce Méd.* 1927. Mar.-Apr., May-June & July-Aug. Vol. 29. Nos. 3-4, 5-6 & 7-8. pp. 9-14; 23-24; 32.

The million refugees which have reached Greece since 1921 suffered pitifully from malaria up to 1925. They were mainly uninfected, mixed with a few from malarious districts and deposited largely in spots notoriously malarial. In certain localities a fifth of them died, for quinine was hopelessly inadequate in quantity. The winter 1924-25 was exceptionally cold and dry, the drought being continued into the summer of 1925, so that most hibernating mosquitoes were killed and the survivors prevented from breeding. In 1925 quinine became abundantly available and housing was becoming adequate. Moreover, the refugees pluckily set to work on intensive cultivation which transfigured the land, an item on which great stress is laid; the State provided the means for them to obtain medical aid; and further infected refugees ceased to arrive. These factors could clearly never have operated had it not been for the arduous, complete, and personal propaganda tours, aided by the cinematograph, which the Inspector of Malaria undertook. As a result, it is noted, malaria in Thrace and Macedonia has not only lost its worst characters but has ceased to be a racial menace.

C. L.

CASTIGLIONI (Arturo). **Italy's Campaign against Malaria.**—*Brit. Med. Jl.* 1927. Aug. 13. pp. 278-279.

The paper is permeated by a sense of high and ancient heritage and modern national progress. Much that it contains is familiar to readers of this *Bulletin*. Sardinia, like its neighbour Corsica, presents the most pressing national malarial problem although parts of Sicily run it close. Malaria has been notified as an occupational complaint and the entire cost of protection of workers is thrown on landowners and contractors. It is definitely stated that in certain parts of Italy—the district of Schito between Castellamare di Stabia and Torre Annunziata is particularly mentioned—anopheles no longer bite man and malaria is disappearing; and that in other places such as San Rossore, near Pisa, they bite only up to July, thus causing the malaria to take on a very mild character.

C. L.

MISSIROLI (A.). La prevenzione della malaria nel campo pratico. [**The Prevention of Malaria in Practice.**—*Riv. di Malarologia*. 1927. May-June. Vol. 6. No. 3. pp. 501-572. With 21 figs. & 2 maps. [1 ref.], [English summary pp. 707-708.] [Anti-Malaria Experim. Station, Rome.]

Certain experimental antimalarial measures were employed under the supervision of the Director General of Public Health and with the co-operation of the International Health Division of the Rockefeller Foundation, in Portotorres, Sardinia, and Bianconovo, Calabria, during 1925. In the following year operations were extended to cover a wider field.

The prevalence of malaria was gauged by the splenic, parasitic, and haemoglobin indices, the number of cases of malaria among children born during the year and among persons immigrating from districts known to be free of the disease, the total number of cases treated during the year, and the records of absences of children from schools.

As a larvicide commercial Schweinfurt green was used, containing some 56 per cent. of arsenious anhydride. Different samples vary in composition; it is, therefore, necessary to analyse each before use. It is heavier than water, and sinks in 24-36 hours. The smallest amount found effective was 5 gm. per 100 sq. metres; twice this strength was employed. As diluents ordinary street dust, slaked lime, ashes, and sand, gave equally good results; the first was the cheapest. The mixture was distributed either by bellows worked by a man from a boat, or, if there was much reedy vegetation, by hand or from an aeroplane.

Treatment was by bisulphate or hydrochloride of quinine in tablets, tannate in chocolate-drops, or other salts in powder within gelatin capsules. The drug was given daily for 60 days; 4 tablets night and morning for 6 days, 4 in the afternoon or evening for the next 15 days, and 3 daily for the last 40 days, for adults.

The results obtained are presented graphically. The daily capture of mosquitoes, for example, ranged between 50 and 400 in Portotorres, a small town of 6,000 inhabitants. Female mosquitoes far outnumbered males. The chief species was *A. maculipennis*. In Bianconovo, *A. maculipennis* and *A. superpictus* were transmitters; in Brancaleone the latter predominated, particularly in June and July.

In Sermoneta 56 per cent. of 905 inhabitants took an average of 24.9 gm. of prophylactic quinine each. In Torpé only 19 per cent. took it. During the first year no noticeable reduction of the splenic index was seen; during the second year it had fallen at Bianconovo from 56.2 to 29.2, and in Portotorres from 46.8 to 27. The fall in the parasitic index was very marked and progressive; thus, it fell in Bianconovo from 17.8 in 1925, to 10.3 in 1926, and to 0.4 per cent. in 1927. In Portotorres for the same period, the figures were 34.2, 8.7, and 5.9 per cent.

The number of children born during the year who were attacked by malaria was 2.6 per cent. in 1925, nil in the following year; in Portotorres, however, there was a slight increase. The number of cases treated in the year fell to zero in the second year at Bianconovo, and to 75 in Portotorres in August, the highest figures for the preceding years in this town being above 400 in 1924 and 250 in 1925.

The campaign has, therefore, been most successful in Bianconovo, whence malaria has been practically abolished, while the benefits at Portotorres are so marked that now only a few sporadic cases are seen.

The report shows abundantly the good which can be achieved by drainage, agriculture, the treatment of patients, and the use of larvicides and of quinine prophylactically.

H. Harold Scott.

ESCALAR (G.). L'opera del Governatorato di Roma contro la malaria infantile nell'Agro Romano. [**Measures taken by the Government of Rome against Malaria in Children.**—*Polichinico*. Sez. Prat. 1927. Sept. 26. Vol. 34. No. 39. pp. 1402-1403.]

In its anti-malaria campaign in the suburbs of Rome the Administration has directed particular attention to children up to 10 years of age, determining the condition of blood and spleen, the hygienic state of their homes and the schools they use. These children have constituted 30 per cent. of all suffering from fever, malaria being established by blood examination. In the spring of 1927 the blood of 783 healthy scholars was examined—with no parasites found—a condition attributed to the prophylactic measures employed. The splenic index was 21 in the spring of 1926 and 12 in that of 1927. Again, the incidence of fever in schools during October-November was 1.1 per cent. and apart from schools 10 per cent. The measures employed included capture of insects, repair of nets, prophylactic quinine and the issue of 500 nets to protect cradles. In the Ettore Marchiafava antimalarial sanitarium there are educated, cured and instructed 50 to 100 children at a time. They remain there about 2 months. Their total number for 1926 was 489, nearly all gamete carriers. A malaria film, showing the Administration's efforts to combat infantile malaria in the Agro Romano, is in use.

C. L.

PECORI (G.) & ESCALAR (G.). Relazione sulla campagna antimalarica del 1926. (**The Antimalarial Campaign of the "Governatorato" of Rome in 1926.**)—*Riv. di Malariologia*. 1927. Mar-Apr. Vol. 6. No. 2. pp. 244-267. With 1 chart in text & 1 map. [English summary pp. 491-492.] [Health Office, "Governatorato" of Rome.]

Antimalarial measures of all kinds have been carried out at a cost of 3,000,000 liras in the Rome administration. There has occurred an increase in population and houses, a halved death-rate and fewer cases treated.

BARD (Leopoldo). **Malaria in the Argentine Republic. Preventive Measures.**—*Jl. Trop. Med. & Hyg.* 1927. Sept. 1. Vol. 30. No. 17. pp. 217-218.

It is suggested that the proposed sanitary tax for defence against malaria in those parts of the Argentine Republic where it is prevalent should be raised by imports on beer and, indeed, on any alcoholic beverage.

SCHWARTZMANN (A. I.). L'épidémie paludique à Kazan en 1925. [**The Malarial Epidemic at Kazan in 1925.**—*Russian Jl. Trop. Med.* 1927. Vol. 5. No. 7. French summary p. 469. [In Russian pp. 414-422.]

Malaria increased greatly in Kazan in 1925. This is attributed to the greater development of *P. falciparum*, excessive summer heat having favoured the increase both of anopheles and of this plasmodium.

DORÉ (G. R.). La réactivation endocrinienne du paludisme. [**Endocrine Reactivation of Malaria.**]—*Bull. Soc. Path. Exot.* 1927. Oct. 12. Vol. 20. No. 8. pp. 718-719.

The significance of this report is indicated by Marcel LEGER's comment upon it—that in a case of tuberculosis in which malaria parasites are not found a febrile attack following an intravenous injection (in this case of postpituitary extract) can be explained without calling in malaria.

GONZALEZ OLAECHEA (Max.). Síndrome cerebeloso de origen malárico. Comunicación enviada a la Academia Nacional de Medicina de México. [**Cerebellar Syndrome of Malarial Origin.**]—*Crónica Méd.* 1927. Apr. Vol. 44. No. 766. pp. 101-111. With 1 text fig.

A man with *P. falciparum* infection had a zigzag walk with loss of equilibrium. The symptoms and the nerve tracts are considered in great detail. After four months quinine treatment he completely recovered.

ABEN-ATHAR (Jayme). *Plasmodium vivax* e *Plasmodium falciparum*. (Considerações sobre a sua alternancia mensal). [*P. vivax* and *falciparum*. **Their Monthly Variations.**]—*Sciencia Med.* 1927. May 31. Vol. 5. No. 5. pp. 225-234. With 1 folding chart and 2 text figs.

The writer looks on *P. vivax* and *P. falciparum* as constituting two races. They conjugate together and will produce offspring on Mendelian lines according as to which is regressive or dominant. The monthly variations he couples with their combinations.

C. L.

ANDERSON (John). The Present Position of Malaria.—*Caduceus* Hong Kong. 1927. July. Vol. 6. No. 2. pp. 105-115. [31 refs.]

ASCOLI (Vittorio). La missione della Scuola Superiore di Malariologia. Discorso per l'inaugurazione del I Corso.—*Policlinico* Sez. Prat. 1927. July 11. Vol. 34. No. 28. pp. 991-994.

BARBER (M. A.) & COOGLE (C. P.). Malaria among Mexican Cotton Pickers imported into Mississippi.—*Public Health Rep.* 1927. May 20. Vol. 42. No. 20. pp. 1368-1370.

BATTAGLIA (Mario). Di alcune febbri malariche continue. Nota clinica.—*Riforma Med.* 1927. July 4. Vol. 43. No. 27. p. 635.

CLARK (Oscar). Impaludismo simulando nephrite com edemas (hydropisia palustre).—*Brasil-Médico.* 1927. July 16. Vol. 41. No. 29. pp. 717-719. With 1 text fig.

COMYN (Kenneth). Antimalaria Work at Moascar, Egypt, in 1925 and 1926, and the Results compared with the Previous Two Years.—*Jl. Roy. Army Med. Corps.* 1927. July. Vol. 49. No. 1. pp. 14-26. With 1 plan & 1 chart. [2 refs.]

FERRÁN (Jaime). Tentativas de inmunización contra el paludismo mediante una vacuna anti-anofélica.—*Riv. di Malariologia.* 1927. Mar.-Apr. Vol. 6. No. 2. pp. 410-413. [English summary p. 494.] [Ferrán Inst., Barcelona.]

GALLAIS (G.). Réveil du paludisme à la suite de brûlures chez un paludéen sans crise depuis 14 ans.—*Rev. Méd. et Hyg. Trop.* 1927. May-June. Vol. 19. No. 3. pp. 82-83.

GRAHAM (J. W.). A Case of Palsy of the Upper Extremity possibly due to Malaria.—*Kenya & East African Med. Jl.* 1927. Aug. Vol. 4. No. 5. pp. 148-152.

IRAMINA (K.). Epidemiologische und klinische Beobachtungen ueber Kinder-malaria in Sudost-Formosa.—*Taiwan Igakkaï Zasshi (Jl. Med. Assoc. Formosa).* 1927. Apr. No. 265. German summary p. 5. [In Japanese.]

- KNOWLES (Robert) & SENIOR-WHITE (Ronald). *Malaria. Its Investigation and Control with Special Reference to Indian Conditions.*—pp.vi+220. With 42 figs. & 6 plates & 29 figs. in Appendices II and III. 1927. Calcutta: Thacker, Spink & Co. [Rs. 7-8.] [*v. Bull. of Hyg.* Vol. 2. p. 765.]
- LANOUE (H.). Le traitement du paludisme.—*Bull. Soc. Méd. d'Haïti.* 1927. July. Vol. 1. No. 3. pp. 84-91.
- MOUZON (J.). La plasmoquine.—*Presse Méd.* 1927. Oct. 26. Vol. 35 No. 86. pp. 1303-1305. [20 refs.]
- MUKERJEE (S. B.). An Interesting Case of Malaria.—*Indian Med. Gaz.* 1927. July. Vol. 62. No. 7. p. 388.
- RACHINA (M. G.). Index bibliographique des travaux russes sur le paludisme depuis 1922 à 1926.—*Russian Jl. Trop. Med.* 1927. Vol. 5. No. 7. [In Russian pp. 450-467.]
- SCHARFF (J. W.). Notes on Practical Measures of Malaria Prevention from the Point of View of Mosquito Control —*Malayan Med. Jl.* 1927. June. Vol. 2. No. 2. pp. 49-53.
- WARASI (W.). Das Zentralnervensystem bei der Malaria tropica.—*Arch. f. Schiffs- u. Trop.-Hyg.* 1927. Sept Vol. 31. No. 9. pp. 432-434. [6 refs.] [*Trop. Dis. Inst., Tiflis.*]

BLACKWATER FEVER.

KIKUTH (Walter). Ueber den heutigen Stand der Schwarzwasserfieberfrage mit eigenen experimentellen Beobachtungen. [**The Present Position of the Blackwater Fever Question, with Some Experimental Observations.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1927. Nov. Vol. 31. No. 11. pp. 501-518. [63 refs.] [Inst. for Ship & Trop. Dis., Hamburg.]

This paper is, as its title implies, mainly a summary of the present state of knowledge regarding certain aspects of blackwater fever. The author defines blackwater fever as a haemolysis of sudden onset accompanied by rigors and a rise of temperature and leading to haemoglobinuria; it is to be regarded as a symptom of manifest or latent malaria and in most cases is precipitated by quinine. It is not to be confused with haemoglobinurias which are caused by a whole series of exogenetic factors such as organic or inorganic poisons, or infective processes, or with the closely similar condition known as paroxysmal haemoglobinuria.

The author refers to the records collected by STEPHENS, NOCHT, and THOMSON, showing that malaria parasites disappear from the blood in the majority of cases after the onset of the paroxysm, and he advances a theory to account for their disappearance. It is generally accepted that erythrocytes invaded by malaria parasites are destroyed, and with the destruction of the red cells the fate of the parasite is sealed. Probably the haemolysis is not accomplished directly but indirectly with the aid of the reticulo-endothelial elements. The reticulo-endothelium comprises, however, at the same time, those cells of the organism which phagocytose the malaria parasites, and in which one can often find malaria parasites after death even in those cases where the blood was negative during life. Further, it must be remembered that after the enormous destruction of red cells an intensive regenerative process sets in very quickly; this is accompanied by a considerable neutrophil leucocytosis. In other words, there is an extraordinarily intensive inflammation of the whole haemopoietic system. The organism mobilizes its entire power for the purpose. It is now generally recognized that the haemopoietic system is to a certain extent the site of immune-body formation, and consequently one may conclude that the resistance of the organism to the malaria infection is also raised and a sort of auto-immunization takes place which naturally need not be of long duration.

Reference is next made to the facts that blackwater fever is usually associated with the malignant tertian parasite and that although attacks do occur in patients who have not taken any drug, quinine in the vast majority is the exciting cause. NOCHT and his collaborators have shown that quinine assists the action of haemolytic amboceptor in the animal organism, although this is not to be seen *in vitro*. If dogs be injected intravenously with a specific haemolysin and then given quinine intravenously a marked haemolysis results, although this does not occur, or only in a modified degree, in the control animals which had received the amboceptor, but not the quinine.

The remainder of the paper consists of references to, and brief discussions of, various recent articles dealing with different problems in blackwater fever, all of which have already received notice in this *Bulletin*.

W. Yorke.

EBERT (M. K.). Zur Frage der Pathogenese der Hämoglobinurie bei der Malaria (Schwarzwasserfieber). [**The Pathogenesis of Haemoglobinuria in Malaria.**—*Ztschr. f. Immunitätsf. u. Experim. Therap.* 1927. Nov. 14. Vol. 53. Nos. 3-4. pp. 297-314. [14 refs.] [Educ. Commissariat, R.S.F.S.R., Moscow.]

The work described in this paper was undertaken with the object of examining the theory of KRITSCHESKY and MURATOFFA that the haemoglobinuria in malaria results from a combined action of quinine and the lipoids of the organism [this *Bulletin*, Vol. 21, p. 386].

The following are the conclusions:—

1. Human serum possesses the power of producing, with quinine, haemolysis of human erythrocytes.

2. As in the case of snake venom the activation of quinine haemolysis is brought about by active or inactivated (56° C.) serum.

3. Along with those substances which possess the power of activating quinine haemolysis there occur in some sera also antagonistic bodies.

4. The degree of haemolysis in the activation of the haemolytic power of quinine by lecithin depends to a certain extent on the individuality of the erythrocytes.

5. The presence of an individual factor both in the activation of the haemolytic power of snake venom by lecithin, and also in the haemolysis by cobra poison alone, is to be regarded as further proof of the analogous action of quinine and snake venom.

6. This analogy is confirmed by haemolysis experiments with the combination cobra poison+lecithin+serum as well as by haemolytic experiments on erythrocytes (after previous treatment with quinine and snake venom) with hypotonic sodium chloride solution.

W. Y.

MAYEDA (Minoru). [**Experimental and Clinical Studies on the Hemolytic Phenomena caused by Quinine Hydrochloricum, and Considerations on the Pathology of Black Water Fever.**—*Fukuoka Ikadai-gaku Zasshi* (*Jl. Fukuoka Med. Soc.*). 1926 Oct. Vol. 19 No. 10. [Summarized in *Japan Med. World* 1927. May 15. Vol. 7. No. 5. p. 147.]

The haemolytic effect of quinine is due to a chemical action of the drug, whilst that of hypotonic saline is mechanical. Quinine haemolysis is accelerated by heat, alcohol, ether, etc.; it is markedly inhibited by acids, but increased by alkalies. Erythrocytes which had been treated with quinine reacted quite differently from those treated with alkalis or acids. Injections of acids or alkalis had no influence on the haemolytic action of quinine *in vivo*. The author states that quinine haemolysis *in vivo* was influenced by seasonal variations and was more marked in summer than during the colder seasons. The paper concludes with a hypothesis of the genesis of blackwater fever.

W. Y.

UNITED FRUIT COMPANY, BOSTON, MASS. FIFTEENTH ANNUAL REPORT MEDICAL DEPARTMENT. 1926. pp. 47-48. [1 ref.]—**Some Notes relating to Malaria and Blackwater Fever.**

Significant observations from Banes Hospital, Cuba, of relationship between malaria and blackwater fever are recorded. The latter is confined to Old World Spaniards and "high-caste Cuban races." In malaria surveys Dr. H. C. CLARK found two cases with abundant young

subtertian forms, neither showing any ill effect. Within 6 hours one of them was down with fever and haemoglobinuria, was admitted immediately to hospital, and was then without malaria parasites detectable in blood films.

In the second case the haemoglobinuria came on 5 days after the routine blood examination, but no parasites were found on his immediate admission to hospital.

The injection, into a negro not suffering from acute disease, of 10 cc. of the whole blood of a man in his first paroxysm of haemoglobinuria resulted in no ill effects—no appearance of malaria or blackwater fever within an observation period of three weeks.

Clayton Lane.

HUDICOURT (Lélio). De la fièvre bilieuse hémoglobininurique. [**Blackwater Fever.**]—*Bull. Soc. Méd. d'Haïti*. Port-au-Prince. 1927. Apr. Year 1. No. 2. pp. 7-11.

This note gives a brief summary of the general characters of blackwater. The author states that in the course of his practice in Haiti, which extends over a period of more than 30 years, he has only encountered 8 cases of blackwater fever. All these were fatal, except the last, and all occurred amongst adult Haitians except one, who was a young Syrian.

W. Y.

AGUILAR (Ricardo). **Treatment of Haemoglobinuric Fever with the use of Haemostatic Serum Intravenously.**—*Fifteenth Ann. Rep. Med. Dept. United Fruit Company, Boston, Mass* 1926. pp. 63-66 [1 ref.]

This report deals with the treatment of 20 cases of blackwater fever with haemostatic serum "Lapenta" (Parke, Davis & Company).

Of the 20 cases, examination of the blood showed 10 to be infected with *P. falciparum*, 3 with *P. vivax*, and 7 to be negative. The cases were of three different clinical types, i.e., 12 were acute, 5 subacute, and 3 paroxysmal. The features of the different types are described. The serum was administered intravenously in doses of from 2 to 4 cc., diluted with 20 cc. of normal saline, and given once or twice daily for the first two days. All 20 cases recovered. The rationale of the treatment is based on the belief that in haemoglobinuric fever the anti-haemolytic substance in the blood is at fault, and that the injection of normal horse serum supplies this anti-haemolytic substance and thus prevents further haemolysis.

W. Y.

MACKIE (A. S.). **Blackwater Fever: Third Attack.**—*Kenya & East African Med. Jl.* 1927. Sept. Vol. 4. No. 6. pp. 188-189.

Clinical details are given concerning an attack of blackwater fever in a Seychelles woman who had lived in Kenya for 8 years and, during this period, had suffered from two attacks of this disease. It is remarked that intravenous injections of sodium bicarbonate had "a wonderful effect in clearing the urine and in increasing its amount."

W. Y.

CIAVALDINI (J.). Un cas d'hémoglobinurie chez une paludéenne n'ayant jamais absorbé de quinine. [**Haemoglobinuria in a Malaria who had never taken Quinine.**]—*Arch. Inst. Pasteur d'Algérie*. 1927. Mar. Vol. 5. No. 1. pp. 48-50. [1 ref.]

Details are given of a case of malaria in which blackwater fever developed, although the patient had never taken quinine.

W. Y.

WEST AFRICAN MEDICAL JOURNAL. 1927. Oct. Vol. 1. No. 2. p. 15.—**The Medical Officer and the Microscope in West Africa.** [A. C.]

Dr. A. C[ONNAL], Editor in Nigeria of this promising venture in medical journalism, the *West African Medical Journal*, referring to a letter on Blackwater Fever published in the *Lancet* and reviewed in this *Bulletin*, Vol. 24, pp. 652-3, takes objection to a comment made by the reviewer on a statement by the writer of the letter to the effect that the microscope was rarely used on the West Coast. The reviewer, in Dr. Connal's judgment, should have emphatically contradicted the implied neglect. Dr. Connal says that a microscope is issued to each medical officer on his arrival, and on his departure is thoroughly overhauled before re-issue. It is not only "largely and usefully used in medical stations but is in most cases regarded as a necessary friend." With his criticisms of the statements about blackwater fever we are not now concerned, but this dictum merits quotation—"The person who blindly trusts to 'religiously' taken doses of quinine, whilst neglecting the ordinary and common-sense safeguards against mosquito-bites, is one of our greatest problems in West Africa."

A. G. B.

SHAH (Brajaballav). A Case of Blackwater Fever.—*Calcutta Med. Jl.* 1927. Oct. Vol. 22. No. 4. pp. 190-199. [8 refs.]

TROPICAL MYCOLOGY.

PINOY (P. E.) & NANTA (A.). Sur l'existence fréquente d'une mycose de la rate en Algérie. [**On a Common Mycosis of the Spleen in Algeria.**]—*C.R. Acad. Sci.* 1927. Feb. 7. Vol. 184. No. 6. pp. 346–347.

The "cysts" found in cases of splenomegaly in which nodules of Gamna are present, are either organs of fructification, or perithecial appendages of the fungus *Sterigmatocystis nidulans*; such cases of splenomegaly being really mycetomas of the spleen. The fungus may penetrate through the skin or through the intestine, and, in doing so, may admit secondary infections of various bacteria, the nature of which may modify the clinical aspect of the condition.

P. Tate.

EMILE-WEIL (P.), GRÉGOIRE & FLANDRIN. La splénomégalie mycosique. [**Mycotic Splenomegaly.**]—*Bull. et Mém. Soc. Méd. Hôpil. de Paris.* 1927. May 26. Year 43. 3rd Ser. Vol. 51. No. 17. pp. 713–717.

PINOY and NANTA in 1926 showed that many cases of chronic splenomegaly in Algeria are of mycotic origin, the parasite being *Sterigmatocystis nidulans* (see preceding summary). The present authors report that mycotic splenomegaly is also frequent in France, especially in Paris where they have found, by operation or autopsy, 7 out of 16 cases to be of mycotic origin.

Clinical diagnosis of the condition is not possible and it is mostly seen in young persons and men. Infected spleens weigh 1–2 kilogrammes, and usually contain characteristic yellowish-brown nodules about the size of a millet seed, which vary in abundance, 1–3 or less being found in a square centimetre. The nodules are filled with mycelial filaments and in several cases easily identifiable heads of an *Aspergillus* were seen. The fungus grows readily on Sabouraud's medium, and appears to be an *Aspergillus*, although NANTA and PINOY cultivated a *Sterigmatocystis* from their cases.

One patient operated on two years ago is cured and enjoys perfect health, but the other cases are too recent to judge as to the final results.

P. T.

GRÉGOIRE (Raymond), EMILE-WEIL (P.) & FLANDRIN (P.). Note pour servir à l'étiologie de la maladie de Banti (la splénomégalie mycosique). [**The Etiology of Banti's Disease.**]—*Bull. et Mém. Soc. Nat. de Chirurg.* 1927. May 28. Vol. 53. No. 17. pp. 734–737. [8 refs.]

This is a preliminary account of the seven cases of mycotic splenomegaly met with in Paris [see below]. None of the patients had ever left France, and none suffered from malaria or syphilis. The earliest symptom is nearly always haemorrhage of the alimentary canal, and it may precede other symptoms by several years. The spleen is very greatly enlarged and there is generally pronounced anaemia. Later, there is enlargement of the liver and ascites. In the later stages, the clinical aspect of the disease is the same as that of the third stage of Banti's disease.

P. T.

EMILE-WEIL (P.), GRÉGOIRE (Raymond) & FLANDRIN. Anatomie pathologique de la splénomégalie mycosique. [**Pathological Anatomy of Mycotic Splenomegaly.**]—*Ann. d'Anal. Path. et d'Anatome Normale*. 1927. June. Vol. 4. No. 6. pp. 587-594. With 1 text fig. & 4 coloured figs. on 1 plate. [Labs. of Clinical Surg. & of Parasit., Algiers.]

This paper is a description of the pathological anatomy of the spleens of 7 cases of mycotic splenomegaly met with in Paris [see above]. All the spleens were very much enlarged and hypertrophied, and contained more or less numerous yellowish nodules, varying in size and form. These nodules were previously described by GAMNA in cases of splenomegaly. The nodules consist of a peripheral haemorrhagic zone, and a central zone consisting of vessels with sclerotic walls, bunches of connective fibres and fibroblasts, and, towards the periphery, giant cells. Amongst these elements were various fungous structures, consisting of closely segmented hyphae and fructifications, distinct *Aspergillus* heads sometimes being visible. In places the fungal elements were incrustated with iron salts, or calcified.

The whole spleen is more or less sclerotic; the follicles of Morgagni are always enlarged; and there are sub-capsular or central haemorrhagic zones. There is more or less cirrhosis of the liver, with granular degeneration of the hepatic cells, but a fungus was never detected in this organ.

The fungus appeared to be the same in all cases, and cultures of an *Aspergillus* were readily obtained, but the species, which is not *fumigatus*, has not been identified. Bacterial infection of the spleen was not recognized in sections or by culture.

P. T.

EMILE-WEIL (P.), CHEVALLIER (P.) & FLANDRIN (P.). Le diagnostic des splénomégalies mycosiques par les moyens de laboratoire. [**Laboratory Diagnosis of Mycotic Splenomegaly.**]—*Bull. et Mém. Soc. Méd. Hôpit. de Paris*. 1927. Nov. 3. Year 43. 3rd Ser. Vol. 51. No. 30. pp. 1425-1429.

Cuti- and intradermo-reactions with *Aspergillus* were not successful. Sero-agglutination with *Aspergillus* was also unsuccessful, but the fixation reaction gave promising results. For the fixation reactions two antigens were used from two strains of an *Aspergillus* (*A. amstelodami*) cultivated from infected spleens. Cultures several months old gave better antigens than newly isolated cultures. A positive reaction is not specific for mycotic splenomegaly, but is nevertheless of some confirmatory value. A negative reaction does not rule out a diagnosis of mycotic splenomegaly. In cases of mycotic splenomegaly the reaction remained positive after the removal of the spleens; and in some cases the reaction was at first negative and became positive after removal of the spleen. Positive reactions may be given by myeloid leucaemia, Hodgkin's splenomegaly, leprosy, certain cases of suppurating bubos, sometimes in secondary or tertiary cases of syphilis, and occasionally in cutaneous tuberculosis, and in some cases of ulcers of the legs.

P. T.

NANTA (A.). Une mycose splénique. Etude histologique. [**Histology of Splenic Mycosis.**]—*Ann. d'Anat. Path. et d'Anatomie Normale.* 1927. June. Vol. 4. No. 6. pp. 573–585. With 3 text figs. & 3 coloured figs. on 1 plate. [1 ref.] [Labs. of Clinical Surg. & of Parasit., Algiers.]

Twenty extirpated spleens were studied, of which 3 were removed for injury to the spleen, one for a hydatid cyst, one for malarial hypertrophy, and the remaining 15 for "splenic anaemia." The last formed two groups: one in which only bacteria were found and no nodular lesions were present; and the other in which, in addition to the bacteria, a fungus and nodular lesions were present. The clinical aspect of both groups was similar.

The nature of the lesions in the last group varies with the duration of the disease. The chief types of lesions are sclerotic pigmented nodules, and lesions in the pulp. The nodules vary in size from that of a pin's head to 2–3 mm. in diameter, and are yellow in colour. Sometimes they are extremely numerous, but may be very small and scarce in other cases. The nodules show three zones: a peripheral haemorrhagic zone; a sclerotic fibroid zone; and a central zone formed of bundles of hyaline, basophilous elements. Small calcified corpuscles of varying sizes are present in the nodules, and are composed of calcified fragments of hyphae, *Aspergillus* fructifications, and abortive perithecia. These are sometimes impregnated with iron salts. Calcareous and ferruginous corpuscles arranged in concentric zones are also present. Streptococci and Spirilla are frequently present. Similar nodules have been described by GAMNA and others, without the presence of parasites having been noted, so that it is doubtful if the nodules are specific to the mycotic infection. From three of the cases cultures of a *Sterigmatocystis* were obtained.

The lesions in the pulp consist of sclerosis of the vessels and cellular proliferation and infiltration. Occasionally, other types of lesions were present in the spleen and the liver was enlarged, congested and with moderate sclerosis, while in one case the ganglia of the splenic hilus were infected.

The frequent association of mycotic and bacterial infections makes it difficult to decide the part played by each in the development of the lesions, and whether the mycotic infection is primary or secondary.

P. T.

SCHWEIZER (A.). Ueber ägyptische Splenomegalie. [**Egyptian Splenomegaly.**] *Schweiz. Med. Woch.* 1927. Oct. 22. Vol. 57. No. 43. pp. 1017–1027. With 7 text figs. [19 refs.] [Path. Inst. Univ., Geneva.]

The author investigated the extirpated spleens of five cases of "Egyptian Splenomegaly," two of which terminated fatally. In one of the fatal cases there were pulmonary complications, and in the other complications of infiltration of the liver and the formation of pseudo-tubercular nodules owing to the presence of eggs of *Schistosoma mansoni*. Full clinical details of all the cases, both before and after operation, are given; and the pathological anatomy of the spleens is described in detail. In three of the cases the spleens contained fibrous granules containing fungous hyphae, which were frequently

enclosed in giant cells, and from which swollen and segmented hyphae often extended into the surrounding tissue. In no case were other parasitic elements found in the spleens.

The granules are formed of connective tissue, and have, usually, one large and two small arteries running in them. Part of the connective tissue of which they are formed, portions of the walls of the arteries, and all the hyphae give a strong iron reaction with ammonium sulphide and with Turnbull's reagent. The granules are the only part of the spleen which give these reactions. The only effective treatment is splenectomy; but this is unavailing when ascites has developed, and such cases always terminate fatally.

The author concludes that some cases of Egyptian splenomegaly must be placed in the new group "*Splenomegaly mycotica*," which WEIL created for certain cases of Algerian splenomegaly found by him to be of fungus origin. [See above.]

P. T.

REVIEWS AND NOTICES.

HEGNER (Robert). [Ph.D., Professor of Protozoology in the School of Hygiene and Public Health of the Johns Hopkins University.]
Host-Parasite Relations between Man and his Intestinal Protozoa.
[The Century Biological Series, Robert Hegner, Editor.]—pp. xiii+231. With 21 figs. (2 plates). 1927. London: New York. The Century Co. [15s.]

In the organization of protozoological work in a school of hygiene and public health the author was at once struck by the lack of co-ordination between medical and zoological phases of the subject and between these and methods of prevention and control. In order to overcome this difficulty in connexion with the intestinal Protozoa of man the author has produced this book, divided into five chapters, in which is gathered together from many scattered sources all the important information regarding the relation of these parasites to their hosts.

In introducing the subject in Chapter I a parallel is drawn between a free-living and a parasitic amoeba, and it is shown that in morphology and in every process and activity that occurs during the life-cycles there are no essential differences. A brief enumeration of the intestinal Protozoa of man is followed by a general account of the biology of Host-Parasite Relations between man and his intestinal Protozoa, including such subjects as the epidemiology of transmission, clinical and parasitological periods during the course of a natural infection, distribution and localization of parasites within the host, passive resistance of the parasite, the parasite's method of attack, changes in the host caused by the parasite, changes in the parasite due to residence in the host, host-parasite adjustments during an infection, therapeutics, route taken by parasites in escaping from the host. The next general section deals with Host-Parasite Specificity in which are considered host susceptibility, parasite infectivity, some problems in host-parasite specificity among intestinal Protozoa. Finally, certain problems in host-parasite relations among intestinal Protozoa are dealt with and a programme of subjects which might with advantage be investigated by a group of protozoologists variously trained in zoology, medicine and public health, is given.

In Chapters II to V, occupying about three-quarters of the text, the various intestinal Protozoa are dealt with individually. Their morphology and life histories are briefly described, and any knowledge which has been gained, and which falls under the above and other headings, is carefully reviewed and discussed in its bearing on public health in its widest application. In addition to purely human parasites the allied forms in animals are considered, for it is not clear in all cases that these may not parasitize man. The author has been careful to give exact references so that original papers may be found in the list of literature at the end of the book, where also are added an author and a subject index. All those interested in the question of prevention of disease will benefit by the perusal of this interesting book, which will afford them a rational and scientific basis for any action they may take. The book is light and of convenient size. It is printed on thick paper with clear, easily readable type, and is illustrated with black and white drawings of the organisms discussed. It could be read with profit by any student of medical protozoology.

C. M. Wenyon.

STITT (E. R.) [A.B., Ph.G., M.D., Sc.D., LL.D., etc.]. **Practical Bacteriology, Blood Work and Animal Parasitology including Bacteriological Keys, Zoological Tables and Explanatory Clinical Notes. A Compendium for Internists.** Eighth Edition, Revised and Enlarged.—pp. xv+837. With 1 plate & 211 other illustrations containing 683 figs. 1927. London: H. K. Lewis & Co. Ltd. [24s.]

The appearance of a new edition of this extremely handy book is a welcome event; it is, in fact, an enlargement of the seventh which was reviewed in this *Bulletin* in 1923. In endeavouring to reduce the size of the volume, by extensive use of small type, by one hundred pages, the author has had to acknowledge failure and, in view of the important additions to our knowledge of clinical pathology in the past four years, has been faced by the necessity of enlarging by more than that number of pages over the seventh edition.

The increasing importance of dental pathology and its bearing on many diseases have made it necessary to include a new chapter on the diagnosis of infections of the teeth.

Other additions include the Kahn test, owing to its relative simplicity and high specificity, the adoption of new nomenclature in the bacteriological keys, and sections describing recent advances in the Streptococcus groups have to be specially noted.

Part II.—"The Study of the Blood"—contains some of the most important changes with sections on blood grouping and compatibility.

In the Appendix new sections on liver and kidney function tests have been added.

The mass of information included in these eight hundred pages exceeds that of any other medical volume of its size, and for every laboratory worker, both within the tropics and without, Stitt's handbook remains indispensable. It must be admitted that the illustrations still remain the weak feature of the book.

Philip Manson-Bahr.

LOTSY (G. O.). [Member of the "Institut d'Egypte," Cairo.] **The Radiographic Diagnosis of Bilharziasis.**—In English 30 pp. With 11 photographic plates (43 radiographs, 1 photograph) 11 plates with 42 schemes and 2 schemes in the text. [Also in French and Arabic.] 1927. Cairo: H. Friedrich & Co., Booksellers & Publishers. Printed by the Amalgamated Press, Egypt.

This records, in English, French and Arabic, an interesting series of observations made of the changes produced in the tissues, chiefly in the urinary system, of persons suffering from bilharziasis, as made evident by means of X-ray examination.

The text of each of the three linguistic sections opens with a note of "parasitic, anatomical and clinical facts." In the course of this it is pointed out that quantities of eggs of the Bilharz worm, in their effort to penetrate through the walls of the viscera, remain in the various layers of the bladder, ureters and intestine. After a time, usually a year, these eggs have become calcified and collectively produce shadows recognizable on skiagraphs of the affected parts, the observation and interpretation of such shadows forming the subject matter of this study.

The second, radiographic, part of each section describes a number of illustrative cases with reference to photographic reproductions included in the final section of the book.

This method of presentation is open to adverse criticism on general grounds but the author has made a careful selection of cases, and the reproductions of skiagraphic appearances are so excellent that each point

brought out in the text is convincingly demonstrated. A minor point has escaped attention in the reproductions, namely the advantage of indicating on each skiagraph the orientation of the patient. A simple R or L imprinted on the appropriate margin of the picture would obviate repeated cross reference to the diagrams or to the text. The diagrams referred to are set out opposite each plate of skiagraphic reproductions and should help the uninitiated to appreciate the variations in shadow density upon which depends the radiologist's interpretation.

The effect of infiltration of the bladder wall with calcified ova is the production of a definite outline shadow of the bladder, and similarly with the ureters. The appearance of such abnormal shadows and their variations are described and a final section then deals with "differential diagnosis," a dangerous term to employ in connexion with any single method of examination. The necessity for correlation with other observations is not, however, overlooked and confirmation by cystoscopy is referred to. Urinary calculus is the condition most likely to cause confusion in a skiagraph and the differential points are well brought out, especially in several cases in which the two conditions are co-existent. This work should be of considerable value to the clinician; certainly to the radiologist it presents a most interesting record of observations which must be of the highest value to any one likely to meet with such cases in his practice.

John Muir.

SCHILLING (Cl.). Immunität bei Protozoeninfektionen. [**Immunity in Protozoal Infection.**]*—Handbuch der pathogenen Mikroorganismen.* 1927. Vol. 8. No. 9. pp. 95-140. With 1 text fig.

The author introduces his subject by explaining why it is that knowledge of immunology in protozoal diseases is less advanced than in the case of bacterial infections. In many cases Protozoa can be studied only in the natural human or animal host and when they can be transferred to laboratory animals they may become profoundly changed in character. Only a comparatively small number can be cultivated and not infrequently the cultural forms differ from those which are actually parasitic. The natural methods of transmission are not easily carried out, while involved life histories tend further to complicate the investigations. Nevertheless, considerable progress has been made and with few omissions the subject is clearly dealt with in the paper under review.

There is a general section of 25 pages followed by a special section dealing with certain individual organisms of 17 pages. Four and a half pages of the more important references (prior to 1927) are given. Though it is admitted that the spirochaetes are not Protozoa they are included, as in many respects they behave serologically in a similar manner. Under the heading of immunity of normal animals and man the resistance of animals to inoculation with human malarial parasites is mentioned and with this is contrasted the susceptibility of laboratory animals to pathogenic trypanosomes and spirochaetes. The statement that *Entamoeba histolytica* appears to be specific to man is hardly correct in view of the ease with which strains can be maintained in kittens, if not in monkeys. The greater part of the general section is devoted to a consideration of immunity in uninfected infections. The separation of parasites, particularly trypanosomes, as distinct species merely because of serological differences is not favoured by the author. The term paroxysmal toxin is introduced for such cases as malaria where the liberation of this substance occurs with a definite suddenness. In malaria at least it appears that the paroxysmal toxin has no appreciable action as an antigen. The subject of infections which terminate in death or recovery is discussed, as also those which are characterized by definite relapses. The serological relationship of the first attack and relapse strains receives attention and this is followed by a consideration of reaction products other than antibodies. Such are precipitin, agglomeration,

attachment, platelet fixation (adhesion phenomenon), trypanolysin, auto-agglutination of red cells, action of human serum, opsinin, complement fixation. The bulk of the work under these headings has to do with trypanosome infections. It is perhaps unfortunate that the complement fixation test of WATSON for the diagnosis of dourine in Canada receives no mention as it appears to be the one instance in which a practical application has been obtained.

The difficult question of the disappearance of symptoms quite apart from the termination of infection is carefully discussed. Under this heading malaria and piroplasmosis are dealt with. Such persisting infections after apparent recovery have been described under various names apart from the author's term labile infections, viz., tolerance, dumb infections, infectious immunity, premunition. The important work of SERGENT and his co-workers, who introduced the term premunition in piroplasmosis, is barely mentioned. The relation of these labile infections to superinfections and relapse infections is next discussed, while the important subject of the localization of parasites in special organs, as, for instance, spirochaetes in the brain, is considered. It is concluded that the action of induced malaria in the treatment of paralytics is probably due to injury to the walls of the blood vessels permitting the passage of antibodies into the brain substance. The immunity which follows administration of chemical agents and that resulting from injection of killed parasites terminate the matter dealt with in the general section.

The special section deals with individual infections which are described as those which result in immunity after a single attack (East Coast fever, chicken spirochaetosis, yellow fever, Weil's disease, rat trypanosomiasis, yaws, leishmaniasis), those which result in immunity after more than one attack (relapsing fever), those which rarely produce immunity (malaria, piroplasmosis) and those which do not give rise to a sterilizing immunity (Texas fever of cattle, the allied disease of sheep, trypanosomiasis, amoebic dysentery). Finally, the toxic substances isolated from spores of sarco-sporidia are discussed. Most of the important data relating to the above mentioned infections are included but the author is careful to point out that as this article is merely part of a general handbook further details will be found in the sections devoted to the diseases themselves. This may account for the failure to mention the important work of TALIAFERRO on the reproduction-inhibiting substances which appear in the blood of rats infected with *Trypanosoma lewisi*. In connexion with yellow fever Noguchi's spirochaete is erroneously referred to as *Leptospira icterogenes* which is the name employed in Germany for the organism of Weil's disease. In connexion with kala azar it is stated that the disease in India is probably always fatal, though authorities have undoubtedly come to the conclusion that the number of spontaneous recoveries is not inconsiderable. Further some will not accept the author's statement that up to the present no single case of spontaneous recovery from sleeping sickness has been reported.

Apart from these and a few other doubtful points the article undoubtedly gives a very comprehensive and accurate review of a difficult subject. It contains a vast amount of information condensed into a small space and, being merely one of a series of articles in the well known handbook of pathogenic micro-organisms, it fulfils its function in a very satisfactory manner and can be accepted as a reliable survey of the present position of immunity in protozoal infections.

C. M. Wenyon.

EPRATUM.

In the Relapsing Fever section, pp. 83-91 of Vol. 25, No. 2, the French word "musaraigne" has been rendered "field vole" instead of "shrew" in ten places. This mistake occurs in the summaries of papers by NICOLLE (Charles) & ANDERSON (Charles) on pp. 83, 84, 90 & 91; NICOLLE (C.), ANDERSON (C.) & COLAS-BELCOUR (J.), pp. 89-90; MATHIS (C.), DURIEX (C.) & EWSTIFFER (C.), p. 87; BRUMPT (E.), p. 91; and in the translation of the title of NICOLLE (C.) & ANDERSON (C.) on p. 90.

attachment, platelet fixation (adhesion phenomenon), trypanolysin, auto-agglutination of red cells, action of human serum, opsinin, complement fixation. The bulk of the work under these headings has to do with trypanosome infections. It is perhaps unfortunate that the complement fixation test of WATSON for the diagnosis of dourine in Canada receives no mention as it appears to be the one instance in which a practical application has been obtained.

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C. M. Wenyon.

BUREAU OF HYGIENE AND TROPICAL DISEASES

TROPICAL DISEASES

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HISTORICAL.

PISSURLENCAR (Panduronga). Contribution [sic] à l'étude de l'histoire de la médecine portugaise dans l'Inde.—I. Sur quelques médecins portugais dans les cours indiennes. [**Contributions to the History of Portuguese Medicine in India. I. Some Portuguese Doctors at the Indian Courts.**]—*Arq. Escola Méd.-Cirurg. Nova Goa.* 1927. Ser. A. No. 1. pp. 61-68. [21 refs.]

It would be diverting to speculate on what the state of the tropics might now be if the bold and famous seafarers and soldiers and settlers of the past had been unsupported by the quiet co-operation of their physicians: for much of the history of tropical colonization has undoubtedly been made—directly or indirectly—by medical men, though the parts which they have played are not always obvious, or even discoverable, without profound research. It is with a very small section of this vast and intriguing subject—the influence of early Portuguese physicians on the history of India—that the present paper deals. The author has been able to consult a number of documents—written in the Portuguese and Marathi languages—which have hitherto been inaccessible to European historians; and as he has thus drawn upon sources not previously tapped, he has found something new to say. To abstract a paper which is itself the briefest summary—largely made by stringing together pertinent quotations and illustrations—is not easy; but the following points of special interest may be noted.

Several Portuguese physicians appear to have assisted in establishing friendly relations between the original colonists of Goa and the neighbouring Mahratta states. We read, for example, that Garcia DA ORTA, author of the famous *Colloquies on Drugs and Simples* (1563) which is known to botanists as containing the first accounts of many Oriental plants [and is said to be the first book printed in Asia], had made himself *persona grata* at the court of Ahmadnagar. "With NIZAM Shah and his family ORTA lived on a footing of the greatest familiarity. He taught Portuguese to the heir presumptive to the throne, and cured him of the itch."

Another physician of the same patronymic, Fernão LOPES DA ORTA, was sent on demand by ALBUQUERQUE to the court of IBRAHIM ADIL Shah at Bijapur—to tend him in his sickness. But LOPES appears to have been more efficient in the intelligence than in the medical service: for his patient the Shah died (1627), and LOPES, suspected of espionage,

was deprived of his nose, one ear, his coloured Christian wife, and his son, and was cast into prison. He managed to get back later, however, —safe, if not sound—into Portuguese territory.

Apparently the early Portuguese doctors enjoyed a considerable reputation among the surrounding native states, and were frequently called upon to minister to the local rajahs. For instance, in 1699 Prince BEARBAGATH sent to the Viceroy of Portuguese India for a physician to cure one of his generals who was ill; while the rulers of Poona, Colapur, and other Mahratta states, made similar requests on like occasions. It would appear, however, that the doctors were not always dispatched as requested; for once at least, when (in 1747) the famous peshwa of Poona, BALLAJI RAO ("NANA"), demanded a medical expert for one of his nobles who had been poisoned by an enemy, the Portuguese governor cautiously sent him some physic instead of a physician. However, BALLAJI RAO's son, MAHDAVA RAO, was long under the care of a Portuguese doctor (whose name has not been recorded); and it is believed that it was largely through his good offices that Goa escaped invasion during a native war in 1771.

These and other particulars are succinctly detailed in the present paper, which deals—as already indicated—with medical contributions to tropical history rather than with the history of tropical medicine.

Clifford Dobell.

WINTER (Francis A.). **The Romantic Side of the Conquest of Yellow Fever.**—*Milit. Surgeon.* 1927. Oct. Vol. 61. No. 4. pp. 438-452.

Colonel Winter has written his essay around REED and his associates. It is difficult to judge whether it is intended to be read as a romantic narrative of the life and work of that gallant band or as a chapter of medical history. Considered as the former it reads coldly, is too full of dates and scientific details; and it is hard to forgive the editor for appending to a paper with such a title five paragraphs of argument about a date.

Colonel Winter says "the romantic in this story shines out like that in the account of Napoleon at Marengo, or of d'Artagnan on the road to Calais." There is about his story, as there was about Napoleon, a heaviness, a something sombre, but nowhere does the reader catch the spirit of d'Artagnan. Take the account of these men bravely inoculating themselves with a loathsome disease. After deliberation on the possible attitude of the Press to human experiments, "the members of the Commission, however, decided to emphasize their personal interest by submitting themselves to the tests." Romance is killed at a blow; one can almost see the Commission in solemn conclave, with resolution duly moved and seconded. Winter reminds us that de Kruif has told this story in popular style; he has indeed and, though the language may be over florid for the taste of some, there lives again in his glowing words something of the ardent spirit that held CARROLL to the work when deprived of his leader, that fortified LAZEAR in the sacrifice of his life and that brought back REED to the post of danger so soon as freed from duty in a safer sphere.

There are many indications throughout the essay that the chief appeal to the author, in the work he records, is the high sense of duty manifested, the grave acceptance of risks well understood and the

serious purpose which actuated the men of whom he writes. That REED himself was rather a Napoleon than a d'Artagnan is the impression given by quoted passages in letters to his wife and by the solemnity with which, when two volunteers for inoculation scorned the proffered monetary reward, he is said to have risen, raised hand to forehead and said with fervour "Gentlemen, I salute you." An interesting contrast offers in the personality of Adrian STOKES, the most recent victim of yellow fever research. His letters describing his work breathe the very spirit of Dumas' Gascon hero.

Regarded as medical history (and Colonel Winter has himself and his editor to thank if his essay is so regarded) the sketch is even less satisfying. It is neither complete nor accurate. The conquest of yellow fever did not begin with FINLAY, nor has it ended yet; the elucidation of its method of spread was not a matter of a few months' intensive work in Cuba. True, the final stages of investigation were brilliantly conceived and rapidly carried through; but what of the directions for the line of advance worked out by pioneers attacking the same disease or another? What of NOTT (1848) and his definite suggestion that mosquitoes were concerned in the spread of it; BEAUPERTHUY (1850-60) holding to his view that the "househaunting mosquito" was the vector; MANSON and ROSS and their 'true bill' of disease-bearing proved against mosquitoes? Did these not point the way? Neither the history nor the romance of the fight against yellow fever can rightly pass over the names of these and others.

One of the most dramatic of the undertakings of REED's men was their demonstration that yellow fever cannot be spread by fomites. No doubt many at that date believed that the disease could be contracted from the linen or person of the infected. Winter, however, says "the validity of this view *was first questioned* [italics by reviewer] when Reed and Agramonte investigated an outbreak of the disease at Pinar del Rio on July 31st, 1900." This cannot be maintained. So early as 1883 HIRSCH writes, "the question concerning the contagious character of yellow fever is decisively answered in the negative"; he quotes LAWSON as saying "there was no evidence to show that persons labouring under the yellow fever, or the bodies of those who had died of it, gave off a poison capable of exciting the disease," adding that "this passage may be taken to express the most recent conviction arrived at by the whole of the medical world acquainted with the circumstances in question."

Without wishing in any way to diminish the courage and fortitude of those of the Cuba researchers who slept for 20 nights in the foul linen of yellow fever patients, it is right to point out that the test had been made before. It is worth while to reprint part of a passage from HIRSCH, written 17 years before the Cuba experiment and quoted in full in this *Bulletin*, Vol. 20, p. 18.

"Even the most intimate kinds of contact, such as the healthy and the sick sleeping in one bed . . . the use of the uncleaned linen, clothes, or beds of yellow fever patients . . . and the like, have in no wise contributed to the spread of the disease. Particular emphasis has been laid in some quarters upon the fact that specially designed experiments to induce infection . . . by the wearing of the linen and clothes used by the sick and saturated with their perspiration, have always yielded a negative result."

There can be no denial of the efficacy of the preventive methods evolved in Cuba, but it is difficult to maintain that the limitation of

yellow fever to its present narrow sphere of action has come about *solely* through the discovery of the insect vector. British Guiana, once a focus of the disease, has been free from it since a date *prior* to the Havana discoveries, but no reduction of *Aedes* was attempted until very recent times. Why did the disease disappear? Why did it not disappear from Cuba?

The conquest of yellow fever can never be complete until the causal organism has been identified with certainty. It may be said, indeed, that the uncertainties surrounding yellow fever have recently increased. One certainty remains; the sacrifice of the lives of LAZEAR and STOKES will never hold back others, but rather attract to this problem both those who see in medical research a noble opportunity of benefitting their kind and those who find in it the risk and glamour of high adventure.

J. F. C. H.

OUY-VERNAZOBRES (Ch.). Le paludisme de Napoleon Ier. [**The Malaria of the First Napoleon.**—*Aesculape*. 1927. Apr. Vol. 17. n.s. No. 4. pp. 98-107. With 11 figs.]

An interesting article, well furnished with portraits and cartoons of Napoleon, but with very slight reference to malaria. It seems that Napoleon was attacked with what was probably benign tertian in Corsica when he was seventeen (1786), that the following year he obtained leave of absence from his regiment from May to December, but was recovered in September and returned to France. In 1788 he joined his regiment at Auxonne on the river Saône and here he had a continuous fever which is described as afflicting him for four days, leaving him for four days and then returning. This is considered by the author to be a second malarial attack; convalescence was slow. Later his health was good and there was no return of fever. At the autopsy in St. Helena in 1821 nothing suggestive of malaria is recorded. The cause of death was, as is well known, cancer of the stomach.

Other matters of interest to us in this article are two illustrations, one of which reproduces a picture by Gros "Bonaparte visite les pestiférés de Jaffa" and the other "Poisoning the Sick at Jaffa," a caricature by Cruickshank. LARREY, among others, records that, to encourage the scared soldiers to save these sick men from massacre by Arabs the Emperor spoke to them and even pressed a bubo so that pus spirted out. This is the scene which Gros depicted.

A. G. B.

SHELTON (C. F.). **Tropical Abscess of the Liver.**—*Kenya Med. J.* 1927. Feb. Vol. 3. No. 11. pp. 315-322.

Treatment. (1) Pre-anaesthetic and pre-antiseptic period—only pointing abscesses opened and drained. Mortality close on 100 per cent.

(2) Anaesthetics and antiseptics—open operation and drainage—mortality 60-80 per cent.

(3) MANSON 1883—trocar and cannula method—a very great advance. MANSON wrote (1883)—"Not many years ago, to tell a patient he had

an abscess of the liver was nearly tantamount to telling him that he was about to die. Since the introduction of the aspirator, the drainage tube, and of Listerism, the prospects in this disease have enormously improved; at any rate we need no longer stand by the patient with folded arms."

(4) The necessity for administering ipecacuanha before and-or after operation began to be recognized [circ. 1909].

MACLEAN in 1871 empirically advocated ipecacuanha together with evacuation by needle and syringe. Apparently he did not realize the most important part played by ipecac.—nor did he do sufficient work to put his treatment on a really sound basis—as did ROGERS years later, to whom belongs the credit of (5) introducing the hypodermic administration of emetine, and of convincing all of the prime necessity of giving this drug in all cases of liver abscess. This, and his work on the pre-suppurative stage of amoebic hepatitis, brought about a marked decrease in incidence and mortality of liver abscess.

(6) The last decade—when in most cases simple aspiration plus administration of emetine has become the method of choice. [Developing into the withholding of aspiration except for the larger collections of pus, and relying more and more on emetine alone.]

The author quotes illustrative cases of 100 years ago—they died of ruptured liver abscess before mercurial poisoning (calomel given until the system was "well under its influence") could kill them. Attention is drawn to the fact that liver abscess may be present in the absence of all the classical signs and symptoms and a case, in illustration, is described. Probably there is always some risk of even fatal haemorrhage from liver puncture. ROGERS considers such accidents more frequent than is supposed; "few surgeons have the courage to report their cases." Most of such fatal accidents occur where no pus was found on exploration—autopsy too showing absence of suppuration in liver. Probably they are cases of pre-suppurative hepatitis with intense engorgement of liver. Therefore a course of emetine should always be given before proceeding to needle suspected cases. After aspiration of pus (all of it at one sitting) a further course of emetine must be given.

H. M. Hanschell.

HERMANS (E. H.). Enkele beschouwingen over de geschiedenis van de framboesia tropica. [*Some Reflections on the History of Yaws.*] —*Nederl. Tijdschr. v. Geneesk.* 1927. Mar. 5. 71st Year. 1st Half. No. 10. pp. 1191–1198.

In this paper, which is a lecture delivered before a scientific society, the author briefly sketches the history of our knowledge of yaws—beginning at the 17th century, and devoting special attention to Dutch contributions to the subject. It is an interesting paper, and contains numerous allusions to the early literature; but as the author presents his own conclusions and interpretations without the support of proper references, it is not always easy to judge how far his conceptions are well founded. He states at the beginning, however, that the present paper is merely a partial account of a fuller historical survey which he is about to publish in a monograph dealing with Framboesia generally. This extended version will be awaited with interest.

Clifford Dobell.

VAN DER WEYDE (A. J.) Bijdrage tot de geschiedenis der pest te Utrecht. [On the History of the Plague at Utrecht.]—*Nederl. Tijdschr. v. Geneesk.* 1927. June 4. 71st Year. 1st Half. No. 23. pp. 3119-3139. With 4 text figs. [Refs. in footnotes.]

It is a striking indication of the interest taken in the history of medicine in Holland that the first issue in the month of the *Nederlandsch Tijdschrift voor Geneeskunde*, the organ of the Dutch Medical Association, always contains several original historical articles. In the present paper the author gives an interesting history of the epidemics of plague in Utrecht from 1439, when the first epidemic occurred, until 1666, the date of the last epidemic.

It is noteworthy as illustrating the association of rats with plague that in 1448 and 1450 attention was drawn by the authorities to the prevalence of these vermin and an order was issued forbidding the destruction of weasels, stoats and polecats and their sale to furriers. During the 15th century little use was made of the existing hospitals for admitting cases of plague, and it was not until the beginning of the 16th century that regulations were drawn for the admission of such cases to hospital, special care being taken by the town council to select those hospitals for the purpose which were in isolated situations. None of those selected are still in existence, but the author's paper contains reproductions of some contemporary engravings of these hospitals, the most famous of which was the Leeuwenborch hospital, where the late Professor MAGNUS's pharmacological institute is at present situated.

During the sixteenth century Utrecht was visited by epidemics of plague in 1507, 1514-1518, 1557-1558, 1574-1575 and 1586, the mortality being highest in 1514.

In the seventeenth century epidemics took place in 1616, 1624-1632, 1634, 1655 and 1664-1666. No subsequent outbreaks occurred, in spite of the prevalence of the disease in Germany.

The author gives a series of tables showing the total mortality and number of deaths from plague in the four quarters of the years 1634-1637, 1655 and 1656 and the annual figures from 1657-1663, as well as a table showing the situation in the town of the fatal cases, from which it appears that plague in Utrecht, as everywhere else, is a disease of the poorer classes.

In conclusion the author emphasizes the fact that our forefathers, in spite of the limitations to their knowledge, did their best to keep epidemics of plague in check.

J. D. Rolleston.

PIÉCHAUD (F.). La peste à Bordeaux et la naissance de l'hygiène urbaine. [Plague and the Birth of Hygiene in Bordeaux.]—*Jl. Méd. de Bordeaux.* 1927. June 10. Vol. 104. No. 11. pp. 447-449.

M. Piéchaud writes of Bordeaux as it was in 1585 and onward to 1672, taking his information from the *Chronique Bordelaise*. In 1585 there was an extremely severe epidemic of plague; from June to December 14,000 people died in the city. Bordeaux was a large, rich and famous city, full of grand and beautiful churches and other buildings; but without proper drainage and having only narrow and filthy streets. In these respects it was no worse than other large cities of the time. The domestic affairs of the city were managed by aldermen. The Mayor,

though chief citizen, was purely decorative, dealing only with outside politics. In 1585 the Parliament fled and many of the citizens followed them. Bordeaux is described as deserted, with only a few aldermen to carry on the administration of the town. When plague was first noticed a man of good position was appointed Captain of the Plague. Early in 1586 the plague hospital was removed outside the walls of the city and good buildings were erected with public money. The resident staff consisted of: an almoner who took care of the clothes and goods of the patients, a barber, a surgeon, a priest, a purveyor and two chambermaids who washed the linen and made the beds. The almoner was controlled by the priest, and at the close of an epidemic these two had to swear before Saint Antoine and Saint Fort that they had conducted their work with honesty! The staff was fed at the expense of the patients. If a patient recovered notice was given to the Captain of the Plague who, with the consent of the aldermen, ordered his discharge after a certain time had been spent in a convalescent hospital.

Any attempt at evasion was punished with whipping. Inside the city the rules were stuck up outside the town hall and criers proclaimed them at the crossways. Did a case occur in any house the owner must inform the ward alderman, who informed the Captain of the Plague. The latter sent a surgeon to examine the case and waited one hundred paces from the house. If the master of the house wished to remain in the house with the patient and family the city locksmith was sent for, and a special lock was placed on the door. No person could leave that house until permission was given. The key was given to a neighbour who was ordered to pass in food at intervals. When the danger was passed the house was opened, cleaned and fumigated, beds and linen were washed and then the family were given freedom. If the master of the house decided that the plague patient could not remain in the house the sick person was at once conveyed to the hospital. The house was locked, a wooden cross placed in front of it and the family were confined for 40 days. Surgeons attending plague cases had to carry a short white rod and the priests also carried a similar rod as an ensign of plague duty. Public games and dances were forbidden during an epidemic. The streets were kept clean and people were forbidden to throw filth and rubbish in front of the houses as was the custom in those days.

J. H. Tull Walsh.

DINĀNAH (Taha). Die Schrift von Abi Ga'far Ahmed ibn 'Ali ibn Mohammed ibn Ali ibn Hatimah aus Almeriah ueber die Pest. [**The Writings of Abi Ga'far Ahmed on the Plague.**—*Arch. f. Geschichte der Med.* 1927. Vol. 19. No. 1. pp. 27–81. [Refs. in footnotes.]

Abi Ga'far Ahmed wrote of plague in Almeriah in the year 749 A.H. (A.D. 1348). He gives a definition of "Ta'un" (plague) which, like the famous Ibn Batūtā, he seems to have studied carefully. Plague is a universal illness from which mankind suffers, generally fatal and due to a common cause. He then discusses this definition in some detail and describes symptoms, thirst, cough, fever and swellings. He says that the direct (near) cause is corruption of the air, which may be partial or total, and makes distinction between the two. The indirect causes (further) require knowledge of astronomy, but are not governed

by climatic conditions, rain, wind, etc. The disease was supposed to have spread from China. Food and drink are considered and as a preventive he recommends

Aloe 2 parts.

Myrtle and saffron each 1 part.

Treatment is that of symptoms with bleeding and syrup of vinegar and syrup of roses, etc. For the buboes also bleeding is useful when there is fever. For outward applications the author recommends for sores oil of roses thickened with mastic and thick quince juice with the following drink :—

Quince juice boiled thick and syrup of roses, of each 1 oz.

Plantain seeds, Armenischer Ton (clay), of each 2 drms.

Many applications containing fat, wax, oil of violets, etc. were to be put on the bubo before suppuration. When the bubo was ripe and contained pus it should be opened.

J. H. Tull Walsh.

D'IRSAY (Stephen). **Defense Reactions during the Black Death, 1348-1349.**—*Ann. Med. History.* 1927. June. Vol. 9. No. 2. pp. 169-179. [78 refs.]

So much has been written about the Black Death during the later years of the fourteenth century that a compiler cannot discover much new material. Many books and documents have been consulted and facts have been taken from the "Black Death" by Johann NOHL, reviewed in this issue of the *Bulletin*. But the study of such history is not only of general interest, it is of value for estimating the mental attitude of those who lived and of those who fought the plague in past times, against great difficulties, having none of the advantages of the scientific knowledge which we now possess. Thus we can understand the progress made since those early days. A few extracts will show that most of the defence work was of a general sanitary nature ; of medical defence little can be said. The depth of graves was one of the main concerns of the authorities, clearly recognizing thereby the contagion inherent in the diseased body as such, even in death. In Avignon much attention was paid to quick and appropriate burial. Pope Clement VI. did things of great charity, and to hasten the burials and prevent infection gave money to anyone who would carry the corpses, for there were hardly enough left to bury the dead. The air of the towns was cleansed by great fires. Simon de Couvain saw that shutting the people up in their houses was no remedy : " To hide is of no avail, flight only protects, but flight where ? " All kinds of things and all kinds of people were accused as the cause of plague. The Jews were especially selected for suspicion and persecution. Pope Clement protected the Avignon Jews and so did the Archduke of Austria, giving them refuge in his fortress, Kyburg. Even then the mob broke through the gates and lynched some of the refugees. In the same years (1348-49), King Casimir of Poland gave asylum to Jews, which is the reason for the dense Jewish population of Poland to-day.

J. H. Tull Walsh.

SEVERN (A. G. Millott). **A Note Concerning the Discovery of the *Bacillus pestis*.**—*Jl. Trop. Med. & Hyg.* 1927. Aug. 15. Vol. 30. No. 16. pp. 208-209. [2 refs.]

This is a controversial article in which the author disputes YERSIN's claim to priority as discoverer of *B. pestis*—see this *Bulletin*, Vol. 24,

p. 341 (LAGRANGE). KITASATO and YERSIN, both working at the same time, discovered the bacillus of plague independently; the former sent a communication to the *Lancet*, 1894, ii, p. 428, while the latter published his discovery in the *Ann. Inst. Pasteur*, 1894, viii, p. 662. In spite of the fact "that Kitasato's first description of the plague organism contained some inaccuracies, doubtless owing to hasty observation and his desire for early publication," Dr. Severn thinks that priority should be given to KITASATO.

J. H. Tull Walsh.

DENNEY (O. E.). **Inaugural Medical Debate on Elephantiasis or Lepra Arabum.** By Benjamin NIESIUS. Translated from the Original Latin and Greek by Chaplain Benedict STETTER.—*Ann. Med. History* 1927. Sept. Vol. 9. No. 3. pp. 267-276. [U.S. Marine Hosp. No. 66 (National Leprosarium) Carville, La.]

With the exception of the present remarkable thesis for the degree of Doctor of Medicine in the University of Strasbourg in 1673, nothing is known of the author Benjamin Niesius, who, as the title page states, hailed from Frankfurt-on-Main.

The thesis opens with a discussion of the etymology of elephantiasis followed by its definition "as a very poisonous, contagious Universal disease arising from atrabilious humour surrounded by many symptoms." The question of heredity is then dealt with, and PLATERIUS is quoted to the effect that "sometimes the children remain immune throughout life, but the plague shows itself in the grandchildren for the first time."

The contagious character of the disease is illustrated by its being transmitted from husband to wife and from the suckling mother to her infant, or through mediate contact when miasms are present in the clothes. Niesius recognized that leprosy was a disease of adolescence and affected males more frequently than females. It is noteworthy that his description of the signs of early leprosy include discolouration of the skin, difficulty in breathing, and numbness and coldness of the feet, while falling out of the hair, the appearance of tubercles beneath the skin of the forehead and cheeks, venous stasis in the face, flattening of the nose, the appearance of pustules, conjunctivitis, cracking of the hands and feet, and extensive ulceration are mentioned as manifestations of the advanced stage. Niesius regarded the prognosis as hopeless, and it is obvious from his review of the surgical, dietetic and pharmaceutical "remedies," the last including the famous potable gold extolled by PARACELSUS, that he expected little benefit to be derived from treatment.

J. D. Rolleston.

VAN SCHEVENSTEEN (A. F. C.). Une consultation de la faculté de médecine de Louvain au sujet de la lèpre à Anvers au début du XVIIIe siècle. [A Consultation of the Louvain Faculty of Medicine on Leprosy at Antwerp at the Commencement of the 18th Century.] —*Janus*. 1927. July-Aug. Vol. 31. No. 7-8. pp. 286-293. [Refs. in footnotes.]

The present communication contains a French translation of a Flemish document drawn up by the Mother Superior of the Terniezen Leper Hospital at Antwerp and addressed to the Medical Faculty of Louvain, together with their reply in Latin.

The circumstances under which this document was drawn up were as follows. Admissions to the hospital were made under the supervision of six of the oldest medical practitioners of the town, three of whom were physicians and three surgeons. According to the Mother Superior the diagnosis of each case was made so hastily that a large number of ordinary skin complaints which had nothing to do with leprosy were admitted to hospital. The doctors, the reverend mother continues, had maintained that there were three stages of leprosy, and that the apparently harmless affections from which the patients were suffering were really the first stage of the disease. In that case it would appear that half mankind was affected with leprosy. The Faculty was therefore respectfully requested to answer the three following questions:

1. Were there really three stages of leprosy?
2. If the hospital, which had been founded for the benefit of lepers, was obliged to keep the patients in all the three stages of the disease, if such stages really did exist?
3. If cases of scabies, eczema, pustules and similar affections should be regarded as leprosy?
4. If it would not be advisable to carry out some preliminary treatment, such as bleeding, so as to determine who really were lepers, or before coming to a final decision to let a certain time elapse during which a test treatment might be applied?

The answers of the Faculty ran as follow:

(1) There are only two kinds of lepra, the *lepra Graecorum*, a form of impetigo, and *lepra Arabum*, or true leprosy. Three stages in true leprosy could be distinguished, viz., the beginning, the advance and the height of the disease, but none of these stages included scabies, much less eczema or similar affections.

(2) The hospital was not founded to keep cases of scabies, ringworm and such like conditions.

(3) Cases of scabies, ringworm, and syphilis could not be regarded as leprosy.

(4) In obvious cases there was no need for special caution, but a special place should be kept for doubtful cases.

The replies did not give entire satisfaction, as was shown by a further enquiry as to the true signs of leprosy addressed to the Faculty, who replied in a somewhat ambiguous strain, with references to the works of FERNEL and SENNERT.

The result was that neither party was satisfied and the apparently acrimonious discussions between the Mother Superior and the consultants of the hospital persisted.

J. D. Rolleston.

MACARTHUR. **Old-Time Typhus in Britain.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1927. Apr. 27. Vol. 20. No. 8. pp. 487-503. With 2 figs. on plates. Also in *Jl. Roy. Army Med. Corps.* 1927. June. Vol. 48. No. 6. pp. 401-418. With 2 text figs.

This interesting lecture is enriched with all the curious lore and varied scholarship to which the author has now accustomed us. For prologue it has a short account of the nature of the louse—that beast whose behaviour in the less fastidious days of *The Merry Wives of Windsor* suggested the agreeable familiarities of love, but whose

scandalous attempts at intimacy are decisively repulsed by the more serious wives of to-day. Here we learn that however different their tastes, our forefathers were not quite so ignorant as some of us are inclined to think, since we are told that their methods of keeping lice in check could not, in principle, be improved on at this moment.

In his approaches to the subject of typhus the author is perhaps more conjectural than is usual with him; it is not until he reaches the year 1414 that we can yield ourselves to his authority and charm. He argues that the word "ague," as it occurs in ancient records and in early literature, had no connexion with chills and rigors, but meant no more than *σύννοχος* [literally "joined together," and applied by GALEN to unremittent fevers], and so means any sort of fever, inclusive of the typhus often concurrent with or sequent to famine; and he suggests that this interpretation is supported by Shakespeare in Macbeth's defiance of the besieging hosts of Malcolm and Siward—"There let them lie, till famine and the ague [i.e., famine fever or typhus] eat them up." Chaucer does indeed contrast an "agu" with a "fever terciane"; but the ague mentioned by the Venerable Bede in his *Ecclesiastical History* was a long continued sickness with recurring fits, the onsets of which were accurately anticipated; and most of Shakespeare's references are either to ague fits (e.g. those of Caliban) and ague shakings (both literally, and also metaphorically of persons in the desperate quotidian of love), or to ague contracted by individuals exposed, insufficiently clad, to foul weather. The author, however, is assured that Macbeth's pious wish was for typhus as a necessary consequence of famine, because in historic times it is definitely known that the two things famine and typhus were constantly associated. This may perhaps be a good enough argument for this one particular quotation; but as to whether it will support the further inference that the pestilences that accompanied all the great famines of Norman and Plantagenet times were typhus fever, one cannot share the author's confidence, since the earliest of these pestilences mentioned by him—that recorded in the *Anglo-Saxon Chronicle* of 1087—is called in Ingram's translation of the *Chronicle*, "diarrhoea," and we know that diarrhoea and dysentery were the chief secondary causes of sickness and mortality in the big Indian famine of 1876-77.

We follow the author with unhesitating interest when he comes to John Stow (c. 1525-1605) and John Howard (1726-1790). Here we get a stirring account of gaol fever, and of the horrors of the gaols, and the iniquities of the gaolers, in the loathsome dens where their typhus-stricken prisoners—even prisoners awaiting trial—were left to rot. "Sometimes untried prisoners, after years of hope deferred, in the end would be carried into court and propped up in the dock, dying on their feet of gaol fever." The miserable victims might linger and rot in oblivion, but at times, when they were dragged out for trial, a sudden awful judgment would fall upon the myrmidons of the law—upon the very judges themselves in their majesty—and its reverberations would spread far from the court of law among a population generally more or less verminous. One such blow—the Black Assize of 1577—fell upon Oxford when gaol fever broke forth among those who had been in court, and the death-roll included two judges, the sheriff and under-sheriff, six justices of the peace, almost all the members of the grand jury, a hundred members of the University ("not a College or a Hall escaping"), and many others, up to a sum total of 510. The author hath made an excellent description of it—an excellent moral on lice

in royal courts, too, as well as in courts of law. Another notorious Black Assize was that of the Old Bailey, in 1750, when, as if to add to the appalling significance of the portent, the Lord Mayor in the middle of the Bench and only those who sat on the left hand of him died of the fever—three judges, all but four of a jury, and more than forty barristers and underlings. This startling calamity was ascribed to lack of ventilation, it having been decided by the great Lord Bacon, nearly two hundred years before, that the fever was caused by some sort of insinuating inodorous smell [we thank the author for this and other japes at that overworked reputation]; consequently a wonderful sort of windmill was devised by the experts and, after a considerable interval was erected on the roof of Newgate, for removing the foul air from the cells. In the course of its erection, 7 out of the 11 workmen took gaol-fever. Notwithstanding that the contraption was pronounced by the experts to be very good, gaol fever was reported as prevalent all over the gaol seven years afterwards. Here again the author, like a modern Herodotus, delights the reader with all sorts of amusing and edifying digressions, including an excursion into the Gordon riots, which he introduces, not to teach us how a King forsaken by pusillanimous Ministers defied and dispersed a licentious mob on his own initiative, but to remind us that the leader of the sedition ended his lawless days in Newgate gaol and died there of gaol fever.

After dealing with typhus as gaol fever we go on to ship fever—to typhus said by LIND, in 1757, to be "the most fatal and most general cause of sickness in the Royal Navy"; and then to illustrations of typhus in armies, or camp fever.

The gradually changing class incidence of typhus is next touched upon. The disease, in Stuart times impartial as death itself, gradually forsakes the gilded chambers of the great as the eighteenth century advances, and finally settles among the narrow cribs of the proletarians—earliest in England, later in Scotland, last in Ireland. The course of these events is well illustrated from letters, Pepys's diary, and the recent history of Ireland. But the author does well to remind us that even in England there were 160 deaths from typhus in 1889, and that even in England the annual returns for the last ten years show a blank column for this disease only once—so that it is not to be regarded as extinct.

Another tribute is now paid to our forefathers, whose clinical descriptions of the disease, two centuries old, are said by the author to be better in some respects than those sometimes found in modern textbooks. The old observers' knowledge of the manner of its dissemination too was accurate so far as it went, and was often efficacious in checking it. "Even the possible rôle of lice . . . was considered." LIND's recommendation for eradicating gaol fever could hardly in the author's opinion be bettered to-day, and ship fever would not have lasted so long after his time if his recommendation, that all drafts for the Navy should go to special depot-ships and there be thoroughly cleansed and given fresh kit, had been adopted.

Finally, the lecturer, like another Timotheus, after moving his audience to laughter for the louse among the poets and the wits and the Tudor fine ladies and Stuart courtiers, ends in heroic mournful strains, with BACOT and CRAGG, and the good and brave doctors who have perished in their hundreds in the long, self-sacrificing combat with this noisome and fell disease.

A. Alcock.

CALLENDER (G. R.), **Dysentery**.—*Arch. Path. & Lab. Med.* 1927. Vol. 3. No. 4. pp. 665–692. With 5 figs. [Historical Reference List & full bibliography.]

A general review. Only an indication of its learned scope and great interest can be given here. Diseases of the intestine are mentioned in the oldest medical document yet discovered—the Brugsch and Eber papyrus. Of religious books, the Babylonian Talmud deals with dysentery. In the Bible there are occasional suggestions of dysentery, e.g., King Jehoram for his waywardness was inflicted with disease of the bowels—they “fell out.” [Possibly this was carcinoma.] HIPPOCRATES used the terms diarrhoea and dysentery, differentiated between them, and noted that one led to the other and both increase in prevalence during the same periods. Lientery (stools containing undigested food) was separated from the first two conditions. He recognized the ages and conditions of greater mortality, and that fever and the passing of fleshlike material denoted a greater severity of the disease. The full accounts of the alvine fluxes given by ARETAEUS and GALEN show that considerable knowledge had been gained of the lesions accompanying the different clinical varieties. The next thousand years show that most of this knowledge was lost.

As to treatment—ipecac is first mentioned in Purchas' Pilgrimes in 1625. It was used as a secret remedy by HELVETIUS in 1680, and financially backed by King Louis XIV. The first reference to emetine is by BARDSLEY in “Hospital Facts and Observations,” London 1830. WOODHULL, U.S. Army, published in 1876 his studies on ipecac—he did not succeed in getting it used in dysentery to the extent to which he felt it was justified. VEDDER in 1911 demonstrated the amoebicidal properties of emetine, and in the next three years Leonard ROGERS standardized its use in amoebic dysentery. The epidemiology of dysentery, 1669–1672, was discussed at length by SYDENHAM [who first described the arthritis of dysentery]. In 1681, LEEUWENHOEK, with the microscope of his own invention, found in his own stool the organism now known as *Giardia* [see this *Bulletin*, Vol. 16, p. 89]. The author further mentions the observations and researches of succeeding workers—until 1857 when MALMSTEN discovered *Balantidium coli* in two cases of chronic dysentery. In 1875 LÖSCH discovered the amoeba of dysentery in bowel discharges and in scrapings from ulcers of gut. KARTULIS, 1886–1891, first described amoebae in pus of liver abscess, and by inoculating cats produced dysentery of the type now known to be caused by *E. histolytica*. The term “amoebic dysentery” was introduced by COUNCILMAN and LAFLEUR in 1890–1891. CASSAGRANDE and BARBAGALLO (1897) differentiated fairly well between the harmless and pathogenic amoebae. SCHAUDINN (1903) introduced the terms *Entamoeba coli* and *Entamoeba histolytica*. His accounts were almost wholly erroneous and it has taken many years to correct the conceptions formed as a result of his work. The distinctions were cleared up to a large extent through the work of WALKER and SELLARS (1911), confirmed by that of W. M. JAMES (1914). In 1925 BOECK and DRBOHLAV successfully cultivated *E. histolytica*.

In 1897 SHIGA isolated a bacillus in epidemic dysentery in Japan. In 1900 FLEXNER described another bacillus from the Philippine dysentery. Since then while convinced that Shiga and Flexner groups produce a characteristic dysentery, it is becoming clear that the *Salmonella* groups also give rise to an entirely similar dysentery.

Transmissible lysis of bacteria (phenomenon of TWORT and D'HERELLE) appears to be particularly applicable to the dysentery group of bacilli, and possibly will in the future influence methods of treatment.

The author goes on to describe and discuss the observations of many workers on the various dysenteries during the Great War, and under the headings protozoa, amoebic, balantidial, flagellate, and bacillary dysentery, describes (and illustrates with excellent plates) each type of disease and its treatment. Once more he emphasizes the practical importance of the cytology of the bowel exudate in diagnosis.

H. M. Hanschell.

BEESON (B. Barker). *Acarus scabiei*: **Study of its History**.—*Arch. Dermat. & Syph.* 1927. Sept. Vol. 16. No. 3. pp. 294-307. With 2 text figs. [29 refs.]

The subject of this paper is the itch-mite, and not the time-old skin-disease for which the creature is responsible. The author disavows any attempts to review all the written records, but in footnotes he gives many useful references to standard works; and among these he notices FÜRSTENBERG'S *Die Krätzmilben der Menschen und Thiere* (Leipzig, 1860) as giving the best account of *Acarus* that has been at his avail, and LANQUETIN'S *Thèse de la gale*, Paris, 1858, as ranking among the best contributions to the subject.

FÜRSTENBERG thought—and the classical authors HEBRA and NEUMANN are in agreement—that the first notice of a parasite in scabies occurs in the writings of ST. HILDEGARDE (1099-1179), abbess of the convent of Rupertsberg; but HARDY (*Maladies de la peau*, Paris, 1858) believed that "an animal" was mentioned by the famous AVERRHOES and BAZIN (*Leçons . . . sur les affections cutanées parasitaires*, Paris, 1862) and certain other authors give the credit to another Arabian physician, ABU-MEZZOAN ABDELMALIK ben Zohar, also known as AVENZOAR and by several other aliases of somewhat similar sound (1070-1162).

Between the eleventh and the sixteenth centuries there appears to be a blank; but the author quotes FÜRSTENBERG as claiming that in the very last year of the sixteenth century John SCHENCK (*Collection of Medical Observations*, 1600) stated that Germans were familiar with the itch-mite and knew how to extract it). Among other sixteenth century writers here mentioned as knowing a good deal about the itch-mite are to be found the familiar names of SCALIGER, FALLOPIUS, and RONDELET, also Laurentius JOUBERTUS (in 1577) and Vidus VIDIUS (in 1586).

It is noted, however, that some of these ancient and mediaeval worthies may have confused (and sometimes did actually confuse) the itch-mite with the louse, or even the crab-louse; and the same caution may be applied to some of the writers of the following century.

Coming to the seventeenth century, we find the names of several competitors for the honour of having actually described and figured the true itch-mite and realized its pathological significance. LANQUETIN (*De la Gale*, Thèse de Paris, 1858) stated that a Frenchman, BOREL (1620), mentioned the tortoise-shape of *Acarus*. KAPOSI credited an Englishman, Thomas MOUFFET (1634), with the first exact description of the itch-mite, and FÜRSTENBERG named MOUFFET as the first to discriminate between *Acarus* and *Pediculus*. RASPAIL (whose works are cited by the author) stated that in 1687 an Italian,

CESTONI, writing under the pseudonym of BONOMO communicated to the famous REDI his discovery of the itch-mite; CESTONI therefore (or BONOMO and CESTONI, if, as some think, they are names of separate persons) has been regarded by some as the original discoverer (or discoverers) of *Acarus* as the responsible parasite of scabies. But here again caution is necessary, since, according to HEBRA, a certain Giovanni CALVOLI claimed in 1689 to have made the discoveries revealed by CESTONI. Among other seventeenth century writers mentioned by the author is Carolinus MUSITANUS (1688) as being one of the first to state that the mite is to be found, not in the vesicles but at the end of its burrow.

Among the eighteenth century writers the author mentions Jacob ZCHWIEBE (1722) whom FÜRSTENBERG wrote of as thinking preserved fruits to be the source of the itch-mite; NYSANDER or NYANDER (1757), who understood that the mite must be looked for in a wrinkle proceeding from the pustule, not *in* the pustules; CASAL (1762), in Spain, who mentioned the mite by its Spanish name *arador* (prob. = Latin *arator*, or *plougher* of the skin); E. L. GEOFFROY (1764) who discriminated between the itch-mite and the flour and cheese mites; WICHMANN (*Ätiologie der Krätze*, 1786), who emphasized the fact—not so well understood at the time—that the *acarus* was the *cause* of the skin disease; the famous Swedish naturalist DE GEER, who gave what FÜRSTENBERG eulogized as the first faithful representation of *Acarus* in man; KRUNITZ (1791) who fancied that the mite could cause disease only in persons so pre-disposed.

In the early part of the nineteenth century there were still people who were uncertain about *Acarus* as a parasite of man and a cause of the disease itch, notwithstanding that the renowned LATREILLE had, in 1806, bestowed the significant generic and specific names *Sarcoptes scabiei* upon the creature; that Joseph ADAMS (1807) had described—instructed thereto by an old lady in Madeira—how the mite could be found, at the end of a fine irregular red line where such a line could be observed issuing from a vesicle; and that WALZ (1809), as well as other veterinarians mentioned by HEBRA, had published instructive observations of the acari that cause itch in sheep and other animals. In 1812 J. C. GALÈS, in Paris, began to investigate the question of scabies, and gave demonstrations of mites found in the vesicles and pustules of that disease, which he believed to be itch-mites. LAMARCK made some rather feeble criticism of GALÈS, and in 1828 MEYNIER, an assistant to RASPAIL, showed that the mites demonstrated by GALÈS were grain mites [which accounts for their having been found in the vesicles]. However, in 1834 one of RASPAIL's pupils, RENUCCI, who had seen dextrous peasants in his native Corsica eliciting the coy *Sarcoptes* from its burrow, put matters right by extracting and demonstrating the true itch-mite before distinguished scientific assemblies in Paris. RASPAIL then seems to have gone too far, since he fancied that the creature penetrated into the human interior and there gave origin to serious disorders, including syphilis. In 1834 Albin GRAS gave himself itch by transferring live mites to his arm. In 1836 AUBÉ discovered the nocturnal habits of *Sarcoptes*. In 1844 HEBRA described the gallery of the female mite, and later he expressed the opinion that the itch-mites infesting animals were identical with the itch-mite of man—an opinion shared by MEGNIN. EICHSTEDT, in 1846, is said to have been the first to communicate the itch-mite of man to the horse and *vice versa*; also to have first described the arrangement of the eggs in the

mite's gallery. KRAEMER (*Virchow's Archiv.* 1872) was the first to describe the male itch-mite seen by him in 1845. In 1848 BOECK and DANIELSEN brought to light the variety of *Sarcoptes* that causes Norwegian itch where the female lives in the crusts and not in burrows.

Among the latest references to the history of the itch-mite and the itch the author gives CUMSTON, "Some Remarks on the History of the Discovery of the *Acarus scabiei*" (*Brit. Jl. Dermatol.* 1924), and PERNET, "Historical Notes on Scabies with Remarks on the Palaeontology of the *Acarus*" (*Ibid.* 1925).

A. Alcock.

RABIES: A REVIEW OF RECENT ARTICLES. VIII.*

It is natural that interest during the last six months should have centred to a considerable extent on the transactions of the International Rabies Conference. Reports of a general nature are furnished by ICHOK¹ and GERLACH². REMLINGER³ discusses the possibility of introducing a standard method of treatment. PRAUSNITZ⁴ gives an admirable resumé of the evidence brought forward regarding the efficacy of the various methods of treatment, and their liability to cause paralytic accidents. FERMI⁵ criticizes some of the resolutions which were adopted. I shall deal with the last three papers forthwith, although they should naturally fall under their appropriate headings in the classification which I have adopted in writing these reviews. Whilst admitting that procedure must vary to some extent according to local requirements, such for example as differences in the type of biting animal, in the severity of biting, in lateness of arrival, and in the proportion of persons bitten on the bare skin, and that consequently a standard degree of success is not to be expected, REMLINGER³ is convinced that a survey of strains of virus which have been considered to be different in type will prove on closer examination that they are identical with the classical virus, as was the case in the examination of the virus of Oulou-Fato. He therefore urges the adoption of a single strain of fixed virus. A resolution in this sense was adopted by the Conference. Standardization of the breed of rabbits was urged by BUSSON, but this would be difficult if not impossible to achieve. The criteria requisite in a method of treatment which could be adopted as a standard would be, efficiency, economy, adaptability to different conditions, and lastly and essentially that accidents of treatment should be reduced to a minimum. There appears to be no essential objection to the adoption of a standard method. Large experimental tests are necessary both for the preparation and standardization of the fixed virus to be employed, and also for the selection of the best method of employing it as a medicament. When the work has been completed, the results should be discussed at a subsequent Conference. If these results are achieved the recent Conference will have attained its object.

PRAUSNITZ⁴ communication deals in particular with the evidence which was actually presented at the Conference regarding these points. The potency of the strains of fixed virus appears to differ to some extent. Polyvalent vaccines are employed in only two institutes. After describing in detail the various methods of treatment, he gives a statistical table which summarizes the evidence presented regarding efficiency

¹ ICHOK (M. G.). Les problèmes actuels de la rage — *Rev. d' Hyg. et de Méd. Préventive* 1927. July. Vol. 49. No. 7. pp. 516-528. [14 refs.]

² GERLACH (F.). Die internationale Lyssakonferenz in Paris.—*Prager Arch. f. Tiermedizin u. vergleich. Path.* 1927. June 15. Vol. 7. Part B. No. 6. pp. 167-173.

³ REMLINGER (P.). Est-il possible de standardiser le traitement antirabique?—*Bull. Acad. Méd.* 1927. Year 91. 3rd Ser. Vol. 98. No. 29. pp. 82-88. [2 refs.]

⁴ PRAUSNITZ (Carl). Ergebnisse der Internationalen Tollwutkonferenz in Paris vom 25-30 April, 1927.—*Cent. f. Bakt. Ref.* 1927. Vol. 87. pp. 529-548.

* For the seventh of this series see Vol. 24, pp. 760-770 and for the Resolutions adopted by the International Rabies Conference pp. 483-6.

and liability to accident in institutes at which more than 1,000 patients have been treated. He has extracted the figures from the various answers to the questionnaire and as they are valuable for reference, I give the table *in extenso* (see pp. 198-199). He draws attention to the fact that the conditions at different institutes differ widely, in the variety of biting animal, (dog, wolf, jackal, etc.), in the age of population treated, in differences of clothing, in distances over which patients have to travel before their treatment can be commenced, etc. These differences are well brought out in the Indian statistics which relate to patients 90 per cent. of whom are indigenous and 10 per cent. European. The mortality amongst the Indians, who are usually bitten on the bare skin, more frequently by jackals, and who arrive later for treatment, is about 1 per cent., whereas for Europeans it is about 0.4 per cent. Since the duration of treatment varies widely (6 days at Novisad, to 39 days at Palermo), the reduced mortality (failure rate) is not a satisfactory measure of efficacy of treatment. He then goes on to discuss paralytic accidents, and draws attention to the fact emphasized at the Conference by PFEIFFER, NEUFELD, HEMPT, and MCKENDRICK that fresh living virus in exceptional cases may be nocuous. PRAUSNITZ concluded from the evidence of the figures, "that for practical purposes one may conclude that inoculation with even large doses of fixed virus which has been absolutely killed, reduces the liability to accident to a minimum." This applies to the carbolized vaccine of SEMPLE, and to the carbolized ether virus now employed by HEMPT. French observers consider CALMETTE's glycerinated cord method to be harmless, but this was not the experience of PRAUSNITZ, who employed it in Breslau. These points were brought out at the Conference during the course of debate.

FERMI⁵ repeats his argument in favour of carbolized vaccines.

i. *Virus*. Before reviewing work on rabies in particular, attention may be drawn to an article on filtrable viruses in general by RIVERS⁶. I understand that this critical review may be taken as authoritative and reflecting the opinions held at the Rockefeller Institute. Over fifty conditions have been ascribed to filtrable viruses by different workers. With few exceptions recovery (if such occur) is followed by a lasting immunity. No virus has been obtained in an absolutely pure state; nevertheless attempts have been made to determine the size of a few viruses. The order of size appears to be about 30 μ . Numerous claims have been made that viruses have been successfully cultivated *in vitro*. In general it can be said that no worker has proved that a filtrable virus can be cultivated in the absence of living cells. They appear to be obligate parasites, in the sense that their reproduction is dependent upon living cells. Whether this reproduction occurs intra or extra cellularly is a debated question. A certain degree of selective tissue localization is apparent (e.g., rabies in brain). Many viruses produce characteristic microscopic changes as evidenced by the presence of inclusion bodies in the nuclei or cytoplasm of affected cells. These are indicative of the presence of the virus, though their nature has not

⁵ FERMI (Claudio). Metodi antirabbici Pasteur, Fermi e Roux Remlinger alla conferenza internazionale della societa' della nazioni.—*Riforma Med.* 1927. July 4. Vol. 43. No. 27. pp. 625-629. [1 ref.]

⁶ RIVERS (T. M.). Filterable Viruses. A Critical Review.—*Jl. of Bact.* 1927. Oct. Vol. 14. No. 4. pp. 217-257. With 1 plate. [410 refs.] [Hosp. of the Rockefeller Inst., New York.]

yet been definitely determined. Some investigators consider them to be products of degeneration, others hold that they are the virus itself, and yet others think of them as virus surrounded by a mantle of altered cellular material. Attempts to produce such inclusions artificially have been unsuccessful. Some, though not all, filtrable viruses are more resistant to glycerine than are ordinary bacteria; all are inactivated by high temperatures. The question of the organized or corpuscular nature of the viruses remains unsettled. Such granules as have been seen may not represent virus alone. Viruses have a remarkable tendency to become adsorbed by particles with which they come in contact. No evidence of respiration has been observed on the part of the rabies virus, amongst others, in the absence of living host cells (BRONFEN-BRENNER¹). It is at present impossible to say whether the viruses are animate or inanimate. Many of the viruses may be closely related or some may have evolved from a common ancestor. Experiments on cross immunization may easily mislead if one is not cognizant of the difficulties usually encountered in this field of work. BUSSON considered that the protection which he observed with vaccine virus against rabies infection was non-specific.

The author concludes as follows: In the majority of virus diseases a close relationship exists between the etiological agent and the cells of the host. This intimate type of parasitism is emphasized by the fact that some of the diseases exhibit a striking species specificity, that the viruses have resisted cultivation in the absence of living cells, that characteristic or specific pathological changes are frequently observed in cells affected by viruses, and, finally, that a host once recovered from a virus disease usually exhibits a lasting immunity.

BLONDIN, WILBERT and DELORME⁷ enquire into the existence of rabies in French West Africa in the light of the results which have been obtained regarding Oulou-fato in Central Africa. No case has been reported from the Ivory coast, but the authors report two cases, one from Ouagadougou which presented the clinical picture of furious rabies, and a second from Niafunke, which induced paralysis on the 11th day when inoculated into a rabbit.

MANOUELIAN and VIALA⁸ have found formations in the brains of young dogs suffering from encephalomyelitis, which they designate the *Encephalitozoon Negrii*. These are similar to *Encephalitozoon cuniculi*, and rabei, in their staining and morphological characters. They are present in the salivary glands, and in the horn of ammon.

LÄSSER⁹ reports cross-immunization experiments in which the sera were those of rabbits, normal, or infected with fixed and street virus, and also from cases of distemper, Borna's disease, and Koritschoner's encephalitis, whilst the extracts were variously prepared from rabies brains and other neurotropic viruses. Precipitation was observed

⁷ BLONDIN, WILBERT (R.) & DELORME (M.). Contribution à l'étude de la rage en A.O.F.—*Bull. Soc. Path. Exot.* 1927. May 11. Vol. 20. No. 5. pp. 404-407. [5 refs.]

⁸ MANOUELIAN (Y.) & VIALA (J.). *Encephalitozoon Negrii*, parasite de l'encéphalo-myélite des jeunes chiens.—*C.R. Acad. Sci.* 1927. Mar. 7. Vol. 184. No. 10. pp. 630-632.

⁹ LÄSSER (Pius). Zur Diagnose der Lyssa durch Präzipitation.—*Ztschr. f. Immunitätsf. u. Experim. Therap.* 1927. Sept. 26. Vol. 53. No. 1. pp. 1-11. [10 refs.] [Federal Animal Disease Control Inst., Mödling, Vienna.]

with specific extracts, with normal brain antigen, and with the antigens of other neurotropic viruses. There was no evidence of any specificity.

CUNNINGHAM, NICHOLAS and LAHIRI¹⁰ report upon the action of ether upon street virus. The action of ether on fixed virus was dealt with in a previous paper (this *Bulletin*, Vol. 24, p. 229). Street virus appears to be more resistant to the action of ether than the Kasauli strain of fixed virus. In the case of street virus, virulence was maintained up to 72 hours immersion in ether, and even after 120 hours immersion; some cases with long incubation periods were observed amongst the test animals. The action of ether vapour was similar but less even.

KAWATANI and OKUWADA¹¹ found that centrifugation at 3,200 to 3,500 revolutions per minute did not completely separate the virulent portion out of an emulsion of brain substance in 0.85 saline; but that the upper layers of the resultant suspension were less toxic than the deeper.

The statement by GRJASNOV (this *Bulletin*, Vol. 23, p. 199) that the rate of loss of virulence is increased with oxygenation has been examined by ISABOLINSKY and ZEITLIN,¹² and by BARONI¹³. The former workers failed to demonstrate any difference in the time of preservation with or without oxygenation. BARONI, however, supports GRJASNOV. Powdered vaccines were obtained by reducing brain substance to a pulp, and then grinding in varying proportions of calcined magnesium sulphate. Before use this powder was mixed with distilled water in the proportion of 1 to 25, and gross particles were allowed to subside; the supernatant fluid was injected subdurally or into the anterior chamber of the eye. The author considers that the rapidity of desiccation was due to an increase in the surface in contact with air. Loss of virulence was almost immediate when the salt was in excess, it occurred within 24 hours when brain pulp and salt were in equal proportions, and in 3 to 6 days when the salt was in defect. In addition it was found that the virulence of powdered vaccines could be maintained up to 3½ months when all air contact was avoided, as for example by mixing and preserving in cocoa butter. According to BARONI, VANSTEENBERGHE (1903) was the first to note the influence of oxygen upon loss of virulence.

ii. *Clinical*. In the *U.S. Naval Medical Bulletin*¹⁴ are described two cases of hydrophobia. The second was considered to be one of street virus infection, although the symptoms simulated those of an

¹⁰ CUNNINGHAM (J.), NICHOLAS (M. J.) & LAHIRI (B. N.). An Investigation into the Value of an Etherised Vaccine in the Prophylactic Treatment of Rabies. Part II. The Action of Ether on 'Street Virus' in Infected Brains.—*Indian Jl. Med. Res.* 1927. July. Vol. 15. No. 1. pp. 85-88. [3 refs.]

¹¹ KAWATANI (Saneto) & OKUWADA (Shyoichi). [On the Attitude of the Lyssa Virus against Centrifugalization.]—*Saikingaku Zasshi (Jl. of Bact.)* 1926. June. No. 364. [Summarized in *Japan Med. World.* 1927. July 15. Vol. 7. No. 7. pp. 208-209.]

¹² ISABOLINSKY (M.) & ZEITLIN (A.). Ueber die biologischen Eigenschaften des Virus fixe. II. Mitteilung.—*Cent. f. Bakt. I. Abt. Orig.* 1927. Sept. 10. Vol. 103. No. 6-8. pp. 427-429. [5 refs.] [State Bact. Inst. & Univ. Lab., Smolensk.]

¹³ BARONI (V.). Action de la dessiccation rapide du cerveau rabique au moyen du sulfate de magnésie anhydre sur le virus fixe.—*C.R. Soc. Biol.* 1927. Oct. 13. Vol. 97. No. 26. pp. 1022-1024. [1 ref.]

¹⁴ UNITED STATES NAVAL MEDICAL BULLETIN. 1927. Oct. Vol. 25. No. 4. pp. 1020-1021.—Two Deaths from Rabies contracted by playing with a Dog which was incubating the Disease in Hankow, China.

acute ascending paralysis of the Landry type. LOPES¹⁵ describes a case in which the diagnosis was doubtful, and goes on to discuss pseudo-rabies psychoses in general.

iii. *Pathology.* Following the line of research of SPERANSKY (this *Bulletin*, Vol. 24, p. 764), PONOMAREFF and TCHECHKOFF¹⁶ examine the conditions under which antirabic serum acts within the body. It is well known that antirabic serum can act *in vitro* but that it is ineffective *in vivo*. The authors ascribe this difference to the difficulty of assuring the penetration of the serum into the cerebral tissue in order that it may come into contact with the virus. Two methods of overcoming this difficulty are described. According to the former the cerebrospinal fluid at the base of the brain is partially evacuated immediately before introduction of the serum. It is claimed that this method is successful and that rabies does not develop, but the number of experiments is not stated. The second consists in causing a rapid oscillation of intracranial pressure, with the object of mechanically removing the "haematoencephalic barrier." This is attained by puncturing the serous cavity and then filling and emptying the syringe two to four times in rapid succession, the last portion being rejected.

YASUYAMA¹⁷ finds that a course of antirabic treatment does not alter the haemolytic or agglutinative action of human serum upon the red blood cells of the guinea-pig or the rabbit. Towards the end of treatment slight traces of complement fixation were observed in mixtures of the patient's serum and rabbit brain protein.

JONNESCO¹⁸ repeated PHISALIX's experiments (this *Bulletin*, Vol. 23, p. 694) on the rabicidal properties of the serum of the hedgehog. From experiments on thirty rabbits, he concludes that the hedgehog possesses some resistance against both fixed and street virus, and that certain exceptional individuals may be refractory. He has never been able to demonstrate neutralization of fixed virus by the serum of the hedgehog either *in vitro* or *in vivo*.

Three papers deal with the haematology in declared rabies and during the course of treatment. JONNESCO and VALTER^{19,20} in the former condition observed a polycythaemia, an increase of viscosity and of the venous blood pressure, a polymorphonuclear leucocytosis with a displacement of the Arneth count to the left. A general diminution of peroxidases ran parallel with the Arneth deviation. In a second paper JONNESCO, VALTER and TEODOSIU²¹ describe a sudden fall of

15 LOPES (I. Cunha). Psychose pseudo-rabica.—*Arch. Brasileiros de Med.* 1927. Aug. Vol. 17. No. 8. pp. 775-778.

16 PONOMAREFF (A.) & TCHECHKOFF (A.). Les conditions de l'action du sérum antirabique dans l'organisme.—*C.R. Soc. Biol.* 1927. July 8. Vol. 97. No. 22. pp. 376-378. [Inst. Exper. Med., Leningrad.]

17 YASUYAMA (K.). Inquiry into the Serologic Side-Effects of the Antirabic Preventive Treatment.—*Philippine Jl. Sci.* 1927. July. Vol. 33. No. 3. pp. 233-248.

18 JONNESCO (Démètre). Sur la valeur rabicide du sang de Hérisson.—*C.R. Soc. Biol.* 1927. Oct. 13. Vol. 97. No. 26. pp. 974-975. [2 refs.]

19 JONNESCO (Démètre) & VALTER (Basil). Recherches hématologiques et cliniques dans la rage humaine.—*Haematologica*. 1927. Vol. 8. No. 3. pp. 213-220. [6 refs.]

20 JONNESCO (Démètre) & VALTER (Basil). Contribution à l'étude hématologique et clinique dans la rage humaine.—*Bull. et Mém. Soc. Méd. Hôpit. de Bucarest*. 1927. Mar. Vol. 9. No. 3. pp. 47-54. [8 refs.]

21 JONNESCO (Démètre), VALTER (V.) & TEODOSIU (T.). Recherches hématologiques pendant le traitement antirabique et au cours de la rage humaine.—*C.R. Soc. Biol.* 1927. Oct. 13. Vol. 97. No. 26. pp. 983-986.

eosinophils and an increase in polymorphonuclear leucocytes as occurring two days before the appearance of symptoms, followed during the course of the disease by a reduction of the former and a continued increase of the latter.

DESPONTIN²² from a systematic examination of a number of treated patients and guineapigs considers the observed polymorphonuclear leucocytosis to be so slight as to be of little value.

In a previous paper (this *Bulletin*, Vol. 24, p. 225), BIGLIERI and VILLEGAS emphasized the view that immunity against rabies did not depend upon the constituents of the blood, but upon the cellular elements of the nervous tissue. BIGLIERI, VILLEGAS and OYARZABAL²³ present further evidence in support of this view. Experiments *in vitro* showed that contact for 24 hours with leucocytes or leucocytic extracts had no rabicidal effect upon fixed virus. From *in vivo* experiments they found that a local leucocytosis in the anterior chamber of the eye or a general leucocytosis were similarly ineffective. Inhibition of phagocytosis, by treatment with such drugs as quinine, produced no modification in the course of the disease.

iv. *Statistics.* KOLDAJEW²⁴ furnishes interesting figures from Kiev relating to the results of treatment, by various methods, during the last 30 years.

	<i>Bitten.</i>	<i>Deaths.</i>	<i>Failures.</i>
(1) 1896-1909 Dried cords ...	19,816	136 (0.69%)	46 (0.23%)
(2) 1909-1919 Intensive cords ...	39,151	153 (0.39%)	47 (0.12%)
(3) 1919-1924 Dried cord + dilutions* ...	9,102	27 (0.30%)	7 (0.08%)
(4) 1924-1926 Dilutions ...	9,793	10 (0.10%)	0 (0.00%)

* In the treatment of this group 3 cc. of a 1-400 dilution was substituted for 1 day dried cord, and 3 cc. of a 1-600 dilution for a 2 day dried cord.

The complications which occurred may be classified as follows. The group numbers are as before.

<i>Bitten or licked.</i>	<i>Accidents.</i>	
	<i>Total Per cent.</i>	<i>Fatal.</i>
(1) 22,721	6 0.027	4 (66%)
(2) 44,668	12 0.027	4 (33%)
(3) 10,403	0 0	0
(4) 13,486	17 0.126	14 (85%)

²² DESPONTIN (Augusto E.) Modificaciones de la fórmula leucocitaria por el tratamiento antirrábico.—*Semana Méd.* 1927. June 2. Vol. 34. No. 22 (1742) pp. 1342-1353. With 24 charts. [7 refs.]

²³ BIGLIERI (R.), VILLEGAS (C.) & OYARZABAL (J.). Acción de los Leucocitos sobre el virus rábico.—*Rev. Inst. Bacteriológ.* Buenos Aires. 1926. July. Vol. 4. No. 5. pp. 544-548.

²⁴ KOLDAJEW (B.). Ergebnisse der antirabischen Impfungen nach der Pasteurschen und der "Verdünnungs"-Methode.—*Ztschr. f. Hyg. u. Infektionskr.* 1927. July 25. Vol. 107. No. 3-4. pp. 523-542. [28 refs.] [Bact. Inst. Kiev.]

The author concludes that the dilution method is more efficient than that of dried cords, that accidents occur with both, but more frequently and more fatally with fresh dilutions. From a closer analysis of his figures KOLDAJEV was unable to confirm VAN GENDEREN'S view that prevalence of post-vaccinal complications is related to the dose of fixed virus employed.

During 1926 1,417 patients were treated at *Shillong* (Assam²⁵) ; of these, 14 contracted rabies (0.99 per cent.), and 6 were failures (0.42 per cent.).

KII²⁶ reports from *Tokyo* that 5,875 patients were treated by dried cords within the period 1915–1926. Of these 13 died. Two paralytic accidents occurred ; these are described in detail by MIYAGAWA.²⁷

Of 415 persons treated at *Coonoor*²⁸ during the year 1926–1927, 4 contracted rabies, of whom 3 were failures. Of 4,373 persons treated in out-districts by vaccine supplied by the Coonoor Institute 25 (0.57 per cent.) contracted rabies, of whom 17 (0.38 per cent.) were failures. The statistical tables set out in this report are unfortunately not of the detailed character adopted in other Indian Institutes. This is regrettable as it renders it impossible to deal with Indian Statistics as a whole.

v. *Rabies in Animals.* AUJESZKY^{29, 30} reports from Hungary that during the period 1900–1925 a total of 9,328 animals had been given antirabic treatment by HÖGYES method. The total dose was 0.2 to 0.79 gm. of fixed virus brain, distributed at first in 10 to 12 inoculations over a period of 25 days, and latterly in 8 to 9 inoculations over a period of 8–11 days. Of the total of 9,328, 3,688 were cattle, 3,671 pigs, 1,349 sheep, 572 horses, 34 goats, 6 asses, 3 mules and 5 geese. It was estimated that 90 per cent. of these were at certain or probable risk. The cases were followed up over a period of six months. Of 8,989 animals which had received a full course of treatment, and which had been actually bitten, 184 contracted rabies (2 per cent.). The failure rate was 0.51 per cent. Some interesting observations upon incubation periods may be quoted.

KINGSBURY³¹ reports that interstate quarantine regulations are in operation in Malaya, dogs being segregated for a period of six months. This controls the movements of dogs by rail or road, but the wandering of stray dogs cannot be prevented. UMENO and DOI'S method of

²⁵ ASSAM. King Edward VII Memorial Pasteur Institute and Medical Research Institute, Shillong. The Tenth Annual Report for the Year ending 31st December 1926. [VARDON (A. C.)]—25 pp. 1927. Shillong. Govt. Press [12 annas—1s. 6d.]

²⁶ KII (N). Answers to the Questionnaire relating to Anti-Rabic Vaccination.—*Scientific Reports Govt. Inst. Infect. Dis.* Tokyo. 1926. Vol. 5. pp. 103–107

²⁷ MIYAGAWA (Y.). Answers to the Questionnaire relating to Anti-Rabic Vaccination. Accidents of Anti-Rabic Treatment.—*Ibid.* pp. 109–111.

²⁸ COONOR, SOUTHERN INDIA. Pasteur Institute. The Annual Report of the Director [GLOSTER, T. H.] together with the Twentieth Annual Report of the Central Committee of the Association for the Year ending 28th February 1927.—30 pp. 1927. Madras. [For official use only.]

²⁹ AUJESZKY (A.). Wutschutzimpfung der Haustiere in Ungarn.—*Deut. Tierärztl. Woch.* 1927. June 18. Vol. 35. No. 25. pp. 399–402. [8 refs.]

³⁰ AUJESZKY (A.). [Statistische Ergebnisse der antirabischen Wutimpfung Ungarn.]—*Allat. Lapok.* 1926. No. 22. p. 283. [Summarized in *Bull. Inst. Pasteur.* 1927. July 31. Vol. 25. No. 14. p. 644.]

³¹ KINGSBURY (A. Neave). On Canine Anti-Rabies Vaccination in Malaya.—*Malayan Med. J.* 1927. June. Vol. 2. No. 2. pp. 48–49. [Inst. Med. Research, Kuala Lumpur.]

prophylactic vaccination has been adopted as a voluntary measure. In the year 1925 over 650 dogs received treatment, i.e., about one-twelfth of the estimated canine population. None of these died, whilst 8 deaths were reported amongst the unvaccinated. In 1926, rabies spread over the Malaccan boundary into Negri Sembilan. Prophylactic vaccination was administered to 250 dogs, one of which subsequently contracted the disease.

<i>Incubation.</i>	<i>Horses.</i>	<i>Cattle.</i>	<i>Pigs.</i>
11 to 14 days ...	2 (7.1%)	2 (1.2%)	16 (24.2%)
15 to 30 " ...	12 (42.9%)	74 (45.4%)	24 (36.3%)
31 to 45 " ...	9 (31.1%)	32 (19.6%)	13 (19.6%)
46 to 60 " ...	3 (10.7%)	20 (12.3%)	4 (6.0%)
61 to 90 " ...	—	18 (11.0%)	7 (10.6%)
91 to 120 " ...	—	8 (4.9%)	1 (1.5%)
121 to 150 " ...	—	2 (1.2%)	—
151 to 180 " ...	1 (3.6%)	1 (0.6%)	—
181 to 210 " ...	—	3 (1.9%)	1 (1.5%)
211 to 300 " ...	—	3 (1.9%)	—
330 " ...	1 (3.6%)	—	—
Total ...	28	163	66

Regarding the prevalence of canine rabies in Uruguay, FREIRE MUÑOZ³² reports that during the period 1921–1925, 4,920 bitten dogs have been from time to time under observation; of these, 187 developed rabies, i.e., 3.8 per cent. Negri bodies were found in the brains of 146 out of a total of 202 dogs which had died of rabies.

THOMAS³³ writes that 30 dogs' brains have been examined in Haiti, and that 18 of these were positive. He then discusses rabies in general for the benefit of local readers, and pleads for the destruction of stray dogs.

A further report regarding the prevalence of rabies in South Africa, (see this *Bulletin*, Vol. 24, p. 760), is submitted by CLUVER³⁴. Since 1916, 11 cases of human rabies have been reported. These may be classified as follows.

<i>Date</i>	<i>District.</i>	<i>Biting Animal.</i>
1916 (2 cases) ...	Heilbron O.F.S.	Mongoose.
1920 ...	Frankfort O.F.S.	Mongoose?
1923 ...	Vredefort O.F.S.	Dog.
1924 ...	Middleburg Tvl.	Mongoose.
1925 ...	Bloemfontein O.F.S.	Dog.
1926 ...	Wolmaransstad Tvl.	Mongoose.
1926 ...	Vryburg C.P.	Genet cat
1926 (2 cases) ...	Ermelo Tvl.	Dog.
1927 ...	Standerton Tvl.	Dog or Mongoose.

³² FREIRE MUÑOZ (Carlos). La rabia y su profilaxis. (Trabajo recomendado por la IV Conferencia Anual de Policía Veterinaria).—*Rev. Hig. y San. Pecuarias*. 1927. Nov. Vol. 17. No. 11. pp. 819–835.

³³ THOMAS (G. C.). La rage en Haiti.—*Bull. Soc. Méd. d'Haiti*. 1927. July. Vol. 1. No. 3. pp. 57–64.

³⁴ CLUVER (Eustace). Rabies in South Africa.—*Jl. Med. Assoc. S. Africa*. 1927. May 28. Vol. 1. No. 10. pp. 247–253. [5 refs.]

Thus in four (possibly five) cases the biting animal was the yellow mongoose, known in South Africa as the Witpuntstert meerkat or geel meerkat : Latin—*Cynictus penicillata* : whilst in one case the spotted genet (moseljatkat or thsepa : Latin—*Genetta felina*) was responsible. All these cases occurred in the northern portion of the Union. None of the recent South African cases have yet been confirmed by pathological examination. Antirabic vaccine is kept in stock at Capetown and Johannesburg. This is a carbolized vaccine prepared according to the Indian formula. It may be obtained on application.

PLANTUREUX³⁵ gives further evidence in support of vaccination of dogs by formolized vaccines (this *Bulletin*, Vol. 24, p. 227). Of 24 dogs so treated three-quarters have resisted infection by a dose of 1 in 50 street virus. He states that the vaccine can be employed without risk, and that the soluble toxins are removed by centrifugation.

FINZI³⁶ finds that for the treatment of herbivora a carbolized glycerine vaccine gives more certain results than an ether vaccine. He gives six injections over a period of three days, the dosage for small animals being 10 cc., and for adult animals 20 cc.

vi. *Paralytic Accidents.* MIYAGAWA and ISHII³⁷ present evidence in support of the observations of SCHWEINBURG (this *Bulletin*, Vol. 22, p. 250) that paralyzes may follow the inoculation of normal brain substance. After intraperitoneal injection of brain and cord emulsions of rabbit and ox, into albino rats, and after subdural injection of similar emulsions into rabbits, paralysis of varying degree were observed in a considerable proportion of the inoculated. The brain substance of the rabbit appeared to be more potent than that of the ox, and subdural inoculation appeared to cause accidents more frequently than inoculation by the intraperitoneal route. As a control experiment similar injections were made with liver emulsion into 33 animals, and in these no untoward effects were observed. The figures are as follows.

Intraperitoneal injection of Rabbit cerebrum into 6 albino rats, 4 paralyzes.

Intraperitoneal injection of Rabbit cerebrum & medulla into 9 albino rats, 6 paralyzes.

Intraperitoneal injection of Rabbit cord into 9 albino rats, 6 paralyzes.

Intraperitoneal injection of Ox cerebrum into 9 albino rats, 9 paralyzes.

Intraperitoneal injection of Ox cerebellum into 8 albino rats, 6 paralyzes.

Intraperitoneal injection of Ox cord into 6 albino rats, 6 paralyzes.

Subdural injection of Ox cerebrum into 7 rabbits, 7 paralyzes

Subdural injection of Ox cerebellum into 7 rabbits, 7 paralyzes.

Subdural injection of Ox cord into 7 rabbits, 7 paralyzes.

The quantities inoculated varied, as also did the number of injections. It is impossible in the space at my disposal to give these in detail, but it may be stated that the total amounts injected into rabbits were of the order of 1 to 2 gm. Histological examinations were made in each instance and these are described in detail.

³⁵ PLANTUREUX (E.). Vaccin antirabique formolé nouvelle méthode, simple et pratique de vaccination préventive des chiens contre la rage.—*Rec. Méd. Vét.* 1927. July 30. Vol. 103. No. 14. pp. 288-292. [4 refs.] [Pasteur Inst., Algiers.]

³⁶ FINZI (G.). [Nuove applicazioni e nuove osservazioni sulla vaccinazione antirabica dei grandi erbivori.]—*Critica Zootec. e Sanit.* 1926. May. No. 5. 10 pp. [Summarized in *Bull. Inst. Pasteur.* 1927. July 31. Vol. 25. No. 14. pp. 644-645.]

³⁷ MIYAGAWA (Y.) & ISHII (S.). On the Influence of the Constituents of Central Nerve Cells parenterally injected into the Living Organism.—*Scientific Reports, Govt. Inst. Infect. Dis.* Tokyo. 1926. Vol. 5. pp. 331-371. With 3 plates. (2 coloured) [24 refs.]

REMLINGER and BAILLY³⁸ attempted to produce accidents in dogs by subjecting them to prolonged treatment by Calmette's method. One out of six dogs which received daily doses of 2 gm. over a period of 101 days showed symptoms of paralysis. It appeared then that such treatment may cause paralysis in certain susceptible animals, but that the liability to accident is not increased by prolongation of the treatment. The proportion of 1 in 6 is similar to that previously observed (this *Bulletin*, Vol. 24, p. 766). The authors proceeded to inoculate one rabbit and one guineapig with an emulsion from each of the brains of four of the survivors of the above experiment: all remained well, showing that the fixed virus had not passed into the nervous system of these animals.

Joseph KOCH³⁹ contributes the first part of an historical review of the whole subject of paralytic accidents. He describes in detail the controversy which raged during the life of PASTEUR; and the later work of GAMELEIA. The résumé is well worthy of study.

vii. *Miscellaneous.* Criticizing the work of DAMMAN and HADENKAMP who stated that the saliva of a dog infected with fixed virus may be infective even when the animal does not contract the disease SCHNÜRER⁴⁰ states that since 1905 he has made many attempts to produce rabies by the subdural injection of parotid gland emulsion of dogs which had died of fixed virus rabies, without success.

RAMON has shown that a previous inoculation of tapioca or of pyogenic microbes at the point of injection of toxins of diphtheria and tetanus causes an inflammatory reaction as a result of which the degree of anti-toxin production is increased. REMLINGER and BAILLY⁴¹ have applied this method to rabies, and have found that abscess formation has no influence either upon the production of rabicidal substances in the blood, or in increasing protection. This confirms the observations of PEREIRA DA SILVA who, as stated in a communication read before the Rabies Conference, used tapioca injections in the case of six men without advantage. It does not appear that the method of RAMON is applicable to antirabic treatment.

ELBERT, JOWELEW and SSUTIN⁴² state that the introduction of treatment centres in West Russia has led to an increase in local interest in

³⁸ REMLINGER (P.) & BAILLY (J.). Effets chez le chien d'un traitement antirabique démesurément prolongé (101 jours).—*C.R. Soc. Biol.* 1927. July 8 Vol. 97. No. 22. pp. 351-353. [2 refs.] [Pasteur Inst., Morocco]

³⁹ KOCH (Jos.). Ueber paralytische, atypische, abortive und die sogenannte Impfwut. Zugleich ein Beitrag zur Geschichte der Pasteurschen Schutzimpfung und eine Entgegnung auf die in den letzten Jahrzehnten erschienenen Arbeiten ueber die Gefährlichkeit dieses Verfahrens.—*Cent. f. Bakt.* I. Abt. Orig. 1927. Oct. 31. Vol. 104. No. 5-6. pp. 381-409. ["Robert Koch" Inst. Berlin.]

⁴⁰ SCHNÜRER (Josef). Ueber die Ansteckungsfähigkeit des Speichels von Hunden nach Impfung mit virus fixe.—*Berlin. Tierärztl. Woch.* 1927. Nov. 11. Vol. 43. No. 45 p. 749.

⁴¹ REMLINGER (P.) & BAILLY (J.). Les abcès favorisent-ils la production de l'immunité antirabique et des substances rabicides?—*C.R. Soc. Biol.* 1927. July 1. Vol. 97. No. 21. pp. 236-238. [1 ref.] [Pasteur Inst., Morocco.]

⁴² ELBERT (B.), JOWELEW (B.) & SSUTIN (J.). Erwägungen und Erfahrungen ueber die Dezentralisation der Tollwutschutzimpfung.—*Cent. f. Bakt.* I. Abt. Orig. 1927. July 1. Vol. 103. No. 1-3. pp. 65-73. [White Russian State Bact. Inst., Minsk.]

antirabic measures. The number of persons treated has increased ; delay in arrival is reduced ; measures of dog control are more readily accepted in the areas served. The Phillips method is employed.

From the time of PASTEUR onwards, the possibility of spontaneous recovery from rabies has been recognized. The historical evidence has been reviewed by LEHR⁴³, who now reports a further case. Histological examination of a brain of a dog which, after developing paralysis, had died with symptoms suggesting a diagnosis of rabies, revealed no definite evidence of rabies infection. Two rabbits were inoculated with an emulsion prepared from this brain. The first of these showed symptoms of slight paralysis on the 10th day after inoculation. By the 13th day the paralysis had extended and the animal presented every appearance of rabies. On the morning of the next day the authors were astonished to find that symptoms had disappeared and the rabbit appeared to be healthy. The rabbit was killed on the evening of the 14th day. No pathological changes of any sort were observed. A subpassage was made into a further rabbit, and after 7 days this rabbit died without having exhibited any symptoms of paralysis. On pathological examination Negri bodies were found in its brain. The second rabbit inoculated from the brain of the original dog became paralysed on the 29th day, died on the 33rd day, and a pathological examination revealed Negri bodies.

A. G. McKendrick.

ANDERSON (C. M.). Rabies in Ontario—*Public Health Jl.* Toronto. 1926. Sept. Vol. 17. No. 9. pp. 448–456. [*v. Bull. of Hyg.* Vol. 2. p. 377]

AVEZZÙ (G.) [Rabies]—*Arch. di Biol.* Genoa. 1927. May-June. Vol. 4. p. 27. [Summarized in *Jl. Amer. Med. Assoc.* 1927. Nov. 12. Vol. 89. No. 20 p. 1729.]

KARŁOWSKI (Zenon). [In Polish.] Stan współczesny wiedzy o wściekliznie a szczepienia leczniczo-ochronne. L'état actuel des connaissances sur la rage et la vaccination.—*Medycyna Doświadczalna i Społeczna.* Warsaw. 1927. Vol. 7. No. 5–6. pp. 435–450. With 2 figs.

VAN DEN HOVEN VAN GENDEREN (Jeanne). Results obtained by Treatment with Fixed Virus killed by Carbolic Acid. Remarks on the British Indian Statistics on Antirabic Treatment and on Lyssa Statistics in general—*Meded. Dienst d. Volksgezondheid in Nederl-Indië.* 1927. Part 3. pp. 457–475. [5 refs.] [Pasteur Inst., Bandoeng, Java.] [*This Bulletin*, Vol. 24, p. 767.]

⁴³ LEHR (E.). Ein Beitrag zur Frage der Selbstheilung der Tollwut bei Tieren.—*Arch. f. Wissenschaft. u. Prakt. Tierheilk.* 1927. Sept. 6. Vol. 56. No. 4. pp. 372–377. [11 refs.] [State Veter. Research Inst., Potsdam].

Institute.	Period.	Method of Inoculation.	Duration of incubation, days.	Number treated.	Mortality.	Paralytic accidents.	Remarks.
					Total per cent.	Total absolute.	
					Reduced per cent.	per cent.	
Algiers ...	1884-1926	Dried 8-21	...	35,841	0.43	2	0
Bangkok ...	1913-1926	Dried 8-21	...	3,265	0.31	0.008	0
Buenos Aires ...	1886-1926	Dried 10-1	...	50,000	0.2	34*	0
1924-1926	Dried 5-1, Gly.	...	...	25,789	0.48	15	0
1924-1926	Dried 8-21	...	...	18,000	0.14	0	0.004
1889-1926	Dried 5-3	...	...	13,104	0.84*	2	0
1887-1926	Dried 8-3	...	...	28,323	0.17	0	0
1914-1926	Dried 10-1	...	...	4,217	0.12	1	0
1908-1926	Dried 10-1	...	...	5,912	0.19	1	0
1915-1926	Dried 5-1	...	...	5,875	0.14	2	0
1915-1926	Dried 5-1	...	...	4,185	0.22	2	0
1886-1926	Dried 4-1	...	...	42,886	0.26	41**	0.005
1908-1926	Cord 1/7-1/3 cm.	Gly.	...	15,443	0.64	11*	0
1908-1926	Philips 80 mg.	...	...	1,774	0.22	3	0
1906-1912	Dried 3-1	Gly.	...	4,798	0.89	4	0.032
1923-1926	Philips 135 mg.	...	...	1,901	0.36	2	0.04
1890-1908	Dried cords, later original Hogyes	...	...	40,721	0.35	2	0.105
1887-1926	Dried 4-2	...	...	84,477	0.77	10**	0
1926	Philips 40-214 mg.	...	...	71,760	0.54	4	0.001
1910-1926	Dried cords, later mod. Hogyes	...	...	5,619	0.33	0	ca. 0.14
1894-1923	Dried cords 5 mg.	...	...	15,738	0.13	3	ca. 0.36
1923-1926	Dried cords 5 mg.	...	...	1,807	0.94	3	0.055
1908-1919	Phenol, living, attenuated	...	...	5,035	0.16	0	0.16
1920-1926	Phenol, living, attenuated	...	...	5,035	0.37	0**	0
1924-1926	Phenol: dead: 280-700 mg.	...	...	11,083	0.19	0	0
1923-1926	Phenol: dead: 280-700 mg.	...	...	2,191	0.44	0	0
1900-1907	Hogyes ...	...	...	3,265	2.65	3	0
1907-1912	Hogyes ...	...	...	1,673	0.42	6	0
1912-1926	Phenol: dead: 350 later 700 mg.	...	...	7,754	0.32	2	0.352
1919-1925	Dried 4-2, severe 4-1	...	...	4,362	1.23	1	0.014
1922-1926	Phenol: dead: 700 mg.	...	...	2,815	0.21	10	0.012
1915-1926	Phenol: dead: 700 mg.	...	...	5,125	0.17	0	0
1917-1925	Phenol: dead: 420-560 mg.	...	...	11,352	0.60	0	0
1922-1926	Dilutions living dead virus, later other attenuated virus.*	...	...	11,364	0.95	0	0
1922-1926	Either 96 hours, then 1 per cent. phenol glycine 21 days. 208 mg. Cord to either 96 hours, then glyc. 1-6 days: 1,000-5,000 mg.*	...	...	5,707	0.12	0	0.026
1922-1927	Either 96 hours, then glyc. 1-6 days: 1,000-5,000 mg.*	...	...	2,699	0.44	1	0
1891-1896	Dried cords, brain: 80% to unheated	...	...	631	0.32	15	0
1898-1913	0.3-0.5 per cent. brain, 70% to unheated	...	...	3,940	0.3	0	0
1914-1926	0.1 per cent. brain, 65% to unheated	...	...	22,377	0.13	0	0
1888-1926	Dried and heated	...	...	65,891	0.4	0	0.037
1888-1926	Dried and heated	...	...	65,891	0.425	2*	0

LEPROSY.

LABERNADIE (V.). La lèpre en Guyane française. Troisième mémoire. [**Leprosy in French Guiana.**]—*Bull. Soc. Path. Exot.* 1927. July 13 & Oct. 12. Vol. 20. Nos. 7 & 8. pp. 623-631; 771-779. [13 refs.]

The first part of this paper was reviewed in this *Bulletin*, Vol. 24, No. 11, p. 906. The present part first gives clinical notes, the most important points brought out being the progressive evolution of the disease, with a more acute course in Europeans, and the tendency for nearly all the cases to be mixed ones, with predominance of skin lesions first and later of nervous lesions. In the early macular stage percussion of the long bones may be painful, loss of the outer third of the eyebrows occurs and the ulna nerve shows signs of irritability. Examination of the subcutaneous branches of the cervical nerves in the neck often reveals hypertrophy only second in frequency to that of the ulnar nerve.

Treatment is also discussed, and the conclusions are come to that colloidal antimony is not effective, eparseno is dangerous, but the ethyl esters of chaulmoogra oil generally give good results, although they fail in some cases. He advocates transforming leper asylums into agricultural colonies with hospitals, and permission for patients to attend dispensaries, by which means the number of cases coming for treatment is greatly increased.

L. Rogers.

LEGER (Marcel). Remarques cliniques sur la lèpre. [**Clinical Notes.**]—*Bull. Soc. Path. Exot.* 1927. July 13. Vol. 20. No. 7. pp. 577-579.

This paper is a short commentary on the preceding one in which the writer confirms LABERNADIE's observations on the occurrence of pain on percussion of bones, including the flat ones, and other points.

L. R.

ARCOS (G.). **Contagion and Transmission in Leprosy.**—*Bol. del Hosp. Civil de San Juan de Dios. Quito.* 1926. Nov.—1927. Jan. Vol. 1. p. 19. [Summarized in *Jl. Amer. Med. Assoc.* 1927. Sept. 3. Vol. 89. No. 10. p. 831.]

Among 150 patients in the Piso leprosarium the author has seen no case of conjugal infection. In about 66 per cent. there were other lepers in the family. Lepers may have healthy children, but one leprous couple had six infected children. He succeeded in infecting a macacus monkey by inoculation, a regressive nodule resulting.

L. R.

MEDEIROS (Luiz). A luta contra a lepra no Paraná. [**The Campaign against Leprosy in Paraná.**]—*Archivos de Hyg.* Rio de Janeiro. 1927. May. Vol. 1. No. 1. pp. 161-173. With 8 figs. on 1 folding plate.

In a Table giving the population and the number of lepers in the various districts of the State it is shown that there are some 380 cases,

or less than one per mille. The different decrees which have been promulgated are given verbatim. The paper is illustrated by a plate with excellent photographs of the buildings and arrangements in the leprosarium of São Roque.

H. Harold Scott.

TORRES (Octavio). Epidemiologia e prophylaxia da lepra no Brasil. [**Epidemiology and Prophylaxis of Leprosy in Brazil.**]—*Brasil-Médico*. 1927. Sept. 17. Vol. 41. No. 38. pp. 971-975. [Faculty of Med., Bahia.]

In former times, a hundred or so years ago, leprosy was a disease with high relative incidence, but owing to vigorous measures of isolation, segregation, the establishment of asylums, and cessation of slave-traffic, the number of cases at the present day is but small, particularly in Bahia. A questionnaire sent to various practitioners in the Capital and in the interior led to unanimous reports as to the rarity of the disease. Including records from various hospitals, the number is stated to be under 100, more than half of which are from the Capital, and among them are 20 interned in the Hospital de S. Lazaros. These welcome facts must not lead to relaxation of efforts at eradicating the disease from the State.

H. Harold Scott.

MOREIRA (Manoelito). O problema da lepra. Discurso feito na Camara Federal pelo Deputado Cearense. [**The Problem of Leprosy.**]—*Sciencia Med.* 1927. Aug. Vol. 5. No. 8. pp. 457-461.

This is a report of a discussion which took place in the "Federal Hall" to ventilate opinions on the method of dealing with leprosy in Ceará. The rate of increase of cases in Fortaleza has been rapid. In 1898 there were 32 noted, in 1917 over 150, while in 1924-25 there were 444 registered lepers.

In the leper hospital of San Sebastião from its foundation in 1920 to May, 1927, there had been 2,500 notifications of which 1,569 were confirmed. Of these only 287 were domiciled in the Federal district, and 742 came from the interior.

The result of the meeting was a resolution to ask for the establishment of asylum-colonies in various parts of Brazil, a matter which it was hoped and believed would be sympathetically received by the Government.

H. Harold Scott.

VITÓN (Alfredo). El problema de la lepra en la República Argentina. [**The Problem of Leprosy in the Argentine.**]—*Semana Méd.* 1927. Nov. 3. Vol. 34. No. 44 (1764). pp. 1208-1214.

This paper comprises a general review of leprosy in the Republic, the various points of which have from time to time been dealt with in this *Bulletin*. No new facts are brought forward.

H. Harold Scott.

WORCY (Isaac). Consideraciones sobre un caso de lepra en Añatuya (Santiago del Estero). [**A Case of Leprosy in Añatuya.**]—*Bol. Inst. Clin. Quirúrg.* Buenos Aires. 1927. Vol. 3. Nos. 21-25. pp. 705-708. With 4 text figs. [Also issued as *3a Reunión Soc. Argentina Patol. Regional del Norte, Tucumán, Julio, 7, 8 y 10, 1927.* pp. 597-600 & illustrations.]

The author states that he is recording this case merely because it was met with in a district where leprosy is rare. It was of the maculo-anaesthetic type, but with widespread lesions; the Wassermann reaction was strongly positive. Treatment with the ethyl esters and sodium salts of the fatty acids of chaulmoogra was undertaken at once, and progress is satisfactory. The patient is still under treatment.

H. Harold Scott.

RAE (Wilson). **Leprosy in the Gambia Protectorate.**—*Gambia Ann. Med. & San. Report for the Year 1926.* Appendix III. pp. 66-74.

This interesting report of a leprosy survey of the Colony revealed a much larger number of cases than had been suspected, namely 100, or 1.4 per mille of the population, although considerable areas remain unexplored. The inquiry showed overwhelming evidence of contagion, mostly in families sleeping together in one hut, and often in the same bed, as in cases of schoolboys and others mentioned, but only one conjugal infection was met with. A total of 57 was due to contagion, and this would have been much increased had time permitted. In three there was a definite history of infection through wearing a leper's clothes, one of inoculation in opening an abscess and four through leper playmates, while the hot damp climate favoured the disease and children were most susceptible; in 13 there was clear evidence of commencement of the disease before the age of 12 years, and in many in infancy. The primary lesion was most often on parts exposed to pressure and the bites of insects—all of which is in accordance with the teaching in "Leprosy." Difficulty has been met with in getting the patients to attend regularly for treatment. The writer thinks segregation is necessary to stamp out the disease, but the cost is prohibitive, and cases might be isolated by the chiefs in a house in the villages. Very brief notes of the 100 cases are added.

In a note on the report T. L. CRAIG, S.M.O., advises the consideration of forming a leper camp for 100 to 150 cases with a small dispensary.

L. R.

KÄYSER (J. D.). De vereeniging ter bestrijding der lepra in Nederlandsch-Indië. [**Association for Combating of Leprosy in D.E.I.**]—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1927. Vol. 67. No. 3. pp. 416-426.

The association was founded in 1906 and took care of the home treatment of lepers, if necessary, aided by their voluntary segregation in local asylums. With the assistance of the Government the association maintained centres for combating leprosy at Batavia, Sourabaya, Semarang and Amboina. By winning the confidence of the native lepers it succeeded in getting a good many of them under regular control. In later years the governmental policy of compulsory isolation of the lepers in certain central asylums frightened the patients, induced

them to conceal their disease and interfered with their registration. The author complains of lack of appreciation of the association's work by the Government and thinks that compulsory isolation will do good in the combating of leprosy in the Dutch East Indies.

W. J. Bais.

CAZENAVETTE (L. L.). **Mental Aspect of Leprosy.**—*Jl. Amer. Med. Assoc.* 1927. Oct. 29. Vol. 89. No. 18. pp. 1496-1500. [12 refs.]

The author records his experience as visiting neurologist to the United States Carville National Leprosarium. He found 80 per cent. of 400 lepers to be normal mentally, and only 3 per cent. had definite psychoses; a larger number showed minor abnormalities, such as mental inferiority and borderland states; 4 per cent. showed depression, and a few were quarrelsome with delusions of persecution at times. The mental cases were equally divided between the skin and nerve types. G. R. MONRAD-KROHN of Norway in a discussion on the above paper concluded that depression is not a direct effect of leprosy or a definite abnormality, and is only indirectly due to the measures taken to isolate the patients, and in Norway he holds that direct leprosy psychoses do not exist.

L. R.

BABONNEIX, TOURAINE & WIDIEZ. Lèpre avec cypho-scoliose. [**Leprosy with Kyphoscoliosis**].—*Bull. et Mém. Soc. Méd. Hôpît. de Paris.* 1927. Dec. 8. Year 43. 3rd Ser. Vol. 51. No. 34. pp. 1575-1578.

The writer describes a case of nerve leprosy complicated by scoliosis from the 4th to the 12th dorsal vertebrae.

L. R.

KLINGMÜLLER (Victor). Ueber tuberkuloide Lepra. [**Tuberculoid Leprosy**].—*Arch. f. Dermat. u. Syph.* 1927. Oct. 23. Vol. 153. No. 3. pp. 584-589. With 10 text figs. (3 coloured). [Univ. Skin Clinic, Kiel.]

This is a detailed account of two cases of tuberculoid leprosy with illustrations of the microscopical appearances, but it presents no new points.

L. R.

BARGEHR (P.). Abortiv verlaufende Lepraerkrankungen. [**Leprosy with Abortive Course**].—*Arch. f. Dermat. u. Syph.* 1927. July 4. Vol. 153. No. 2. pp. 295-299. [1 ref.]

The author gives short reports of five cases of undoubted mild leprosy which cleared up in a comparatively short time, and the cures claimed are based not only on the clinical and bacteriological findings, but also the results of cutaneous inoculation of lepromin, or sterilized leproma extracts. Such cases of abortive leprosy are commoner than is generally supposed, and owing to such patients often not seeing a doctor at all their recognition is not easy. Further, abortive leprosy in the sense of the penetration of the lepra bacilli into the body without the occurrence

of any symptoms of the disease is also frequent in persons who have been in close contact with lepers for a long time. Such people may give a positive lepromin reaction, which the author thinks is a sign of existing immunity to leprosy.

L. R.

MUIR (E.). **The Effect of Kala-Azar on Leprosy.**—*Indian Jl. Med. Res.* 1927. Oct. Vol. 15. No. 2. pp. 497-499. [2 refs.]

The author has detected 16 cases of kala azar among the inmates of the Calcutta Leper Asylum, one of whom died of tuberculosis and two of septicaemia. The remaining 13 cases recovered from their kala azar under treatment, and every one of them showed a marked improvement of their leprosy with partial or entire disappearance of the leprosy lesions, and the lepra bacilli became granular. In fact the improvement was so striking that other leper patients volunteered for inoculation with kala azar. On the other hand, he has seen early leprosy appear during the latter part of treatment for kala azar after the cessation of fever in five patients, in three of which old disease had been lit up again. He thinks the improvement in the former class is due to fever of kala azar leading to bursting of leper cells setting free the bacilli, with subsequent antitoxin formation and immunity with resulting improvement; and he explains the latter cases owing to the few lepra bacilli present in the early stages not being sufficient to produce immunity in the same way.

L. R.

MOTTA (Joaquim). Importancia do diagnostico na prophylaxia da lepra—formas atypicas da doenca. [**Importance of Diagnosis in Prophylaxis of Leprosy.**]—*Archivos de Hyg.* Rio de Janeiro. 1927. Sept. Vol. 1. No. 2. pp. 103-118. English summary facing p. 119.

In Brazil compulsory notification and isolation of lepers are in force, but nerve cases may be permitted to live at home under good conditions. The value of such prophylaxis depends largely on the ability of the doctors to recognize the disease promptly, which is not always easy, especially in the early stages. Attention is drawn to certain leprosy lesions resembling those of other skin diseases, such as tuberculoids, lupus, annular granulomata, sarcoides, and Sagin [? Bazin] erythema, as well as syphilitic skin lesions and nodular erythema.

L. R.

PALDROCK (A.). **On the Chemistry of the Leprosy Organism. Part IV.**—*Amer. Jl. Trop. Med.* 1927. Nov. Vol. 7. No. 6. pp. 405-408.

Fifteen organisms isolated by various workers from leprosy cases, and believed by them to be the cause of the disease, from Kedrowski to Reenstiera's, have been submitted to staining by methylene blue, methyl green and victoria blue after treatment by different strengths of acids and other powerful chemicals to remove in succession free nucleic acid, bound nucleic acid as nuclear protein, karvonic acid, and

free lipid and lipoproteins, and in all stages both lepra bacilli from leprous patients and those of the cultures tested gave similar staining reactions ; so the author concludes that these results support the conclusion that these cultures are all those of the bacillus of leprosy.

L. R.

MUIR (E.). **Sodium Hydnocarpate in Leprosy, Suggested Improvements in Administration.**—*Indian Jl. Med. Res.* 1927. Oct. Vol. 15. No. 2. pp. 501-505. With 2 figs. on 1 plate. [1 ref.]

Dr. Muir has investigated the causation of the blocking of the veins following intravenous injections of Rogers' original sodium hydnocarpate, which Muir considers a great advance on insoluble preparations previously used. Sections of obstructed veins shows the presence of considerable proliferation and swelling of the intima narrowing or obliterating the lumen, and leading later to the reduction of the vein to a thin fibrous cord or its complete disappearance. When it is given subcutaneously much pain may be caused. Recently ROGERS has introduced a much less irritating preparation of the sodium salts made from the lower-melting-point fatty acids of hydnocarpus oil, which is painless on subcutaneous injection in a 3 per cent. solution, and can be given intravenously for a long time in a 1 per cent. solution in sufficient doses to produce the desired slight reactions. As larger intravenous doses are advisable in some cases, such as early ones or those nearly cleared up, the difficulty can be overcome by the simple device of using a syringe with double the capacity of the required dose, with a central nozzle, and sucking up into the required dose of 2 to 8 cc. of a 2 per cent. solution about an equal quantity of blood, rotating the syringe on its long axis with the needle in the vein, to mix the blood with the dose, and injecting the whole. Thousands of such injections have never produced clotting or any untoward symptom, and the sodium salts of the whole hydnocarpus oil are also unirritating intravenously or subcutaneously when mixed with blood.

Another way of getting over the difficulty is to make the sodium salts from *H. anthelminica* oil or *H. alpina*, which have less haemolytic power than that from *H. wightiana*. Muir now uses 2 per cent. sodium hydnocarpate intravenously mixed with blood in doses of 2 to 8 cc. following a course of pure hydnocarpus oil subcutaneously. [I have confirmed Dr. MUIR's simple method of avoiding blocking of the veins. Burroughs Wellcome & Co. have now put my new preparation on the market under the name of "Alepol" at an extremely low rate, which allows about 700 doses to be made up from 100 grammes of the powder, and full doses to be given twice a week for a year at a cost of just over 2s. per case or one-twentieth the cost of a good ethyl ester. Very good reports are being received of its use, which is quite painless and very popular with native patients in various parts of the world.*]

L.R.

* A note from Messrs. Burroughs Wellcome & Co. states: "Alepol" is a selected fraction of the sodium salts of the total fatty acids of hydnocarpus oil. The selection of the lower melting point sodium salts . . . obviates to a considerable extent the old disadvantage of vein-blocking, which occurred when these compounds were injected intravenously." "Alepol" is used intravenously and intramuscularly, and is issued in 25-gramme bottles.

LABERNADIE (V.) & LAFFITTE (N.). *Traitement de la lèpre par l'huile d'Hydnocarpus wightiana* (Bl.). (Note préliminaire.) [**Treatment of Leprosy by *H. wightiana* Oil.**—*Bull. Soc. Path. Exot.* 1927. Oct. 12. Vol. 20. No. 8. pp. 710-716. [7 refs.] [Colonial Hosp., Pondicherry, French India.]

After discussing the chaulmoogra oils obtained from different varieties of trees, the authors report the preliminary results of a short trial of Muir's method of subcutaneous injections of pure *H. wightiana* oil with 4 per cent. creosote during three months, given twice a week in doses increased gradually from 2 to cm.; they had no severe reactions and obtained encouraging results, which will be reported on again later. They have introduced the *H. wightiana* trees to Pondicherry, and the oil has the advantage of being very cheap.

L. R.

DE VERA (Bonifacio). **A Brief Report on the Progress of the Treatment Work in the Culion Leper Colony up to March, 1927.**—*Jl. Philippine Islands Med. Assoc.* 1927. Oct. Vol. 7. No. 10. pp. 361-366. [4 refs.]

A total of 3,133 patients were under treatment in the period dealt with, of whom 77 per cent. improved, including 8.4 per cent. who became negative, 11 per cent. were stationary and 11.5 per cent. were worse. During the last five half-yearly periods the results have been very similar, as shown in a table. During the last half year 106 negative cases were added to the 226 remaining at the end of the preceding period, and 52 have been released on parole; 23 per cent. of the remaining 275 have again become positive bacteriologically, most of whom had not been included in the permanent negative list, but a few were true relapses. An analysis is given of the results with various modifications of the injections used. The best results were obtained with iodized chaulmoogra ethyl esters with or without the addition of creosote, but the simple preparations of plain *H. wightiana* oil gave nearly as good results and did not cause induration of the muscles at the site of injections.

In addition to intramuscular injections small doses into the skin lesions appear to produce benefit.

Six metallic preparations were also tried, but four of these completely failed, namely cupriiodase, cuprocyan, tryparsamide and sanocrysin. The gold compounds, krysolgan and triphal, produced slight improvement, but on account of their high price their routine use in leprosy cannot be recommended. Javanin, a pancreatic extract of Dutch origin, injected subcutaneously for five months in three patients produced no effect.

L. R.

EUBANAS (Froilan C.) & DE VERA (Bonifacio). **Notes on the Treatment of Leprosy with Certain Gold Preparations.**—*Jl. Philippine Islands Med. Assoc.* 1927. Sept. Vol. 7. No. 9. pp. 319-323. [6 refs.] [Culion Leper Colony, Philippine Health Service.]

The use of gold preparations in tuberculosis suggested their trial in leprosy, so krysolgan and triphal have been used in five cases each, with two slightly improved and three stationary with the first, and one slightly improved with the latter. Both were given intravenously in

doses of 0.01 gram up to 0.08 gram in 2 cc. of freshly distilled water every ten days for three to four months. No case became worse under the treatment, which was of too short duration to test more than the immediate effects, so further observations will be necessary.

L. R.

PALDROCK (A.). Die CO₂-Schnee- und Solganalbehandlung der Lepra. [**CO₂-Snow and Solganal Treatment in Leprosy.**—*Arch. f. Schiffs- u. Trop.-Hyg.* 1927. Oct. Vol. 31. No. 10. 459-471. With 6 text figs. [3 refs.]

Solganal is an organic gold preparation (4 sulphomethylamino-2-auro-mercaptobenzol-1-sulpho-acid-di-sodium compound, C₇H₆O₆NS₂Na₂Au). It contains 36.5 per cent. of gold. Four women and three men, who had previously received CO₂ snow treatment, were given solganal in total doses of 11.137 to 13.137 gm., and all showed fever and local reactions in the nodules at irregular intervals, but without material blood changes except increased leucocyte counts in all, especially of the lymphocytes at the expense of the neutrophils. The quantity of lipase in the blood increased because of the free nucleic acid and gram-positive lipoid acid and lipoproteids liberated from the leprosy bacilli. Solganal is able to attack the granules of the organisms when their envelope has been removed by the previous CO₂ snow treatment, which prepares the way for the action of the gold compound. Moreover, the organism which has ceased to react to the CO₂ snow receives a fresh stimulus from the solganal, which mobilizes so much fresh cellular and blood action that healing is once more started. The author believes that CO₂ snow has an immunizing and solganal a chemotherapeutic action, so both are indicated to supplement each other.

L. R.

MUIR (E.). **The Iodide-Antimony Treatment of Leprosy.**—*Indian Jl. Med. Res.* 1927. Oct. Vol. 15. No. 2. pp. 507-510.

Iodides are regarded by most workers as dangerous in leprosy owing to their producing exacerbations of the disease, but some regard them as useful in diagnosis, especially in facilitating the search for lepra bacilli in the nasal secretions. The author has come to the conclusion that potassium iodide may be useful in wisely regulated dosage by causing breaking down of the leprosy tissue, leading to the production of immunity if begun in small doses such as a grain, which may produce a reaction, and gradually increased until 240 grains can be given without any reaction. The signs of reaction are swelling up and redness of existing lesions, the appearance of fresh red nodules, marked acceleration of blood sedimentation, apparent granulation of lepra bacilli in the lesions and sometimes fever. If the new rose-coloured nodules disappear again in a few days the doses may be increased safely. The drug may be used in all stages, and as the leprosy tissue clears up the doses may be increased to 20 to 30 grains once or twice a week to cause a rise of temperature of 2 to 4 degrees for one or two days, and when reactions cease the doses are rapidly increased to 180 to 240 grains and continued for some months.

The precautions required are to begin with 1 grain daily, and increase by the same amount each day until slight local or febrile reactions occur, and continue the treatment in the same doses when the

temperature falls to below 99° and local reaction begins to subside, but only once or twice a week, increasing the dose again when no reaction occurs. If a reaction lasts more than three days give 0.02 gram of potassium antimony tartrate in 2 cc. saline intravenously every second day until the reaction has ceased. When the dose reaches 20 grains increase by 5 grains at a time, and when 60 grains is reached increase by 30 at a time up to 120, and when no reactions occur increase up to 240 grains, and continue the 240 grains twice a week for three periods of one month with a rest of one month between each course. The doses should be given dissolved in one or two tumblers of water at bed time, and intermissions should only be made if the patient feels very weak. For painful nerve reactions adrenalin chloride is given intramuscularly. The temperature should be taken at least four times a day to enable the doses to be regulated. The drug may also be used as a diagnostic agent to determine when patients are cured. [Thanks to the kindness of Dr. Muir in sending an early copy of his paper the reviewer has been able to confirm the value of potassium iodide in clearing up the last signs in cases of leprosy nearly cured with the new sodium hydriocarpate, Alepol, and in confirming the cure of cases who had lost all signs of the disease. Dr. Muir's discovery promises to be a most important advance.]

L. R.

STRAITS SETTLEMENTS. **Appendix "A." Leper Asylums. 1.—Leper Asylum, Singapore.** [LINDOW (E. D.).] **Appendix "B." Treatment of Leprosy at Pulau Jerejak.** [WHEATLEY (A. W.).]—*Straits Settlements Med. Rep. for Year 1926.* pp. 69–81. With 29 photographs.

At Singapore there were 37 males and 51 females at the end of 1926. *H. wightiana* oil with 0.5 per cent. iodine was mainly used by injection bi-weekly in doses of 2 to 5 cc. At the Leper Settlement of Pulau Jerejak 681 lepers were under special treatment, 490 of whom were advanced cases. "The lowering of the death rate from 30.68 in 1921 to 13.76 in 1926 shows how beneficial special treatment is in all cases." Here *H. wightiana* oil was also in general use for injections, and advanced cases received Tai Fong Chee orally, consisting of three parts of *H. wightiana* kernels with 1 part of Indian hemp seed in doses of 10 to 30 grains daily. Surgical treatment, mainly removal of necrosed bone and amputation of digits, was of value, and injections of 10 grains of soda salicylate in 3 cc. normal saline intramuscularly gave remarkable relief to neuritic pains; 2 minims of adrenalin hydrochloride in 20 minims saline subcutaneously is useful for leprotic fever. Sodium morrhuate and sodium soyate was used in 20 cases with 1 cleared up and 8 improved. The Tai Fong Chee treatment in 345 cases showed 229 improved, but none markedly so or cleared up. Details of 8 cases cleared up are given.

L. R.

COCHRANE (Robert G.). **Leprosy—Symptoms, Diagnosis and Treatment.**—23 pp. The Mission to Lepers, 33 Henrietta Street, London, W.C.2.

This little pamphlet gives a very useful brief account of the subject, suitable for helping those in charge of lepers, and includes prognosis.

The treatment recommended is on the lines of Dr. MUIR of Calcutta by hydnocarpus oil or ethyl esters. It was apparently written before the reintroduction of the painless and cheap hydnocarpates now known as Alepol.

L. R.

ITURBE (P. M.). La sedimentación globular en el estado patológico : sedimentación globular en la lepra. [**The Rate of Sedimentation of Red Blood-Corpuscles in Leprosy.**—*Gac. Med. de Caracas*. 1927. Jan. 15. Vol. 34. No. 1. pp. 7-13.]

The author has estimated the velocity of corpuscular sedimentation in various morbid conditions and here records his results in the different types and stages of leprosy. The method employed is that of WESTERGREEN. The blood was taken between 10 a.m. and noon, citrated and placed in the tubes up to a definite mark and the rate of sedimentation in millimetres was noted at the end of 1, 2, and 24 hours. 110 cases were examined, 70 of whom were males. Generally speaking, the rapidity of sedimentation was greater in women than in men, but in no instance was the rate the same as occurs in normal subjects.

As regards the type of disease : in the actively nodular forms or the mixed in which the nodular predominated, the rapidity was very marked, in some as much as 100 mm. in the first hour ; in the nervous form it was much less and in cases with mutilation it varied between 40 and 76 mm. The clinical state considerably influenced the rate. The blood of patients with attacks of fever and abundant lepromata in full development yielded the highest degree of rapidity, as much as 100-150 mm. in the hour, and higher during the febrile period than when the temperature had fallen. Only in those residing in the leprosarium who were apparently healthy and in whom bacteriological examination was negative did the rate approach anything like normal.

Finally, the effect of treatment. When chaulmoogra is first begun the rate is increased, perhaps owing to a reactivation of infection. The corpuscles of those who had been for a long time under treatment and whose condition was clinically improving, sedimented at a lower rate and, vice versa, if the conditions were becoming worse the rate increased.

The test is likely to be of service, therefore, in cases of suspected leprosy, since a normal sedimentation-rate excludes leprosy and even in patients without clinical symptoms and negative bacteriologically the author never saw a fall of less than 7 mm. in the first hour.

H. Harold Scott.

ARQUIVOS INDO-PORTUGUESES DE MEDICINA E HISTORIA NATURAL.
Nova Goa. 1927. Vol. 4. 326 pp. [**Leprosy in Portuguese India.**]

This publication comprises six separate articles. The first deals with the history of leprosy in Portuguese India ; the second consists of records of over 100 cases to form a basis for statistics ; the next two are devoted to Chaulmoogra and other plants which may be used for treating the disease ; the fifth presents various suggested prophylactic measures ; the last is a report of the proceedings of the Leprosy Conference.

The historical account, though brief, is interesting. The disease has existed for a long time and has probably increased during recent years, but definite proof of this is wanting, seeing that statistics are not reliable. In February, 1916, Professor CORREA estimated that there were 100 lepers in

Gôa and suggested the establishment of a leprosarium on the island of Acarô. Matters move slowly in these districts. Eighteen months later the question was debated and in March, 1921, several sites were considered and the island first proposed was selected as the most suitable. The measures of the Government were assisted by charitable institutions, the Asylum of Maçuçá and the Hospice of Margão.

The second contribution is divided into four sections. In the first are brief records of 110 typical cases; in the second *formes frustes* and latent cases are spoken of, also with records, though of the briefest, merely a line or two to each; in the third are similar notes on 52 patients coming from places outside Gôa itself, the fourth giving the family-histories of a few of these. Such an investigation was needed before any purposive prophylactic measures could be formulated and taken in hand and they serve to show that the diagnosis of infection is not always a simple matter, and further, that the social problem of the way in which relatives and contacts should be dealt with is also by no means easy of solution.

In the third paper, *Gynocardia odorata* is stated to be the source whence the chaulmoogra oil is obtained. The chaulmoogra (falsely so called) of China is made from *Hydnocarpus anthelmintica*. In Gôa there are three species of *Hydnocarpus*, namely, *H. wightiana*, *H. anthelmintica*, and a third at present unidentified. Also useful in leprosy, according to the author, GRACIAS, are: (1) *Calotropis gigantea* (the "Flora sagrada of India") of which the bark, the flowers, and the viscid juice are employed; the dose is 3-10 gm. (2) *Hydrocotyle asiatica*, one of the Umbelliferae, from which a fluid extract is prepared and given in doses of 1-5 drops; larger doses are toxic. An unguent is made for external use and is said to give excellent results in elephantiasis and leprosy; it contains 1 part of the extract to 8 of lanolin. Other plants are mentioned, but the reported benefits resulting from their use in leprosy need further experimental work and clinical confirmation.

The problem of prophylaxis is based on the following main indications: (1) Compulsory notification; (2) isolation of severe cases; (3) treatment in hospitals or dispensaries; (4) domiciliary isolation by permission in special cases; (5) early removal of children from a leprous environment; (6) careful supervision of all those living in the near neighbourhood of sufferers; (7) intensive educational propaganda.

The concluding section, the report of the Conference, is largely a summary of the preceding papers which have been printed *in extenso* in the previous parts of the book.

H. Harold Scott.

MUIR (E.), HENDERSON (J. M.) & LANDEMAN (E.). **Tumour-Like Growths caused by Intraperitoneal Inoculation of *B. leprae murium*.**—*Indian J. Med. Res.* 1927. July. Vol. 15. No. 1. pp. 15-19. With 5 plates (4 coloured).

The resemblance of the organism of rat leprosy to that of the human disease, and the fact that the former can be easily inoculated from one rat to another makes its study of interest. The authors found that all the rats which survived subcutaneous or intraperitoneal injections developed signs of rat leprosy within four or five months, but the latter method of injection produced much grosser lesions, including intra-abdominal tumours in five out of seven animals, which weighed up to 20 gm. and affected any part of the peritoneum. They were characterized by an external organized layer lined by a thick caseous layer with liquefaction in the centre. On microscopical examination the outer layer contained numerous large cells crammed with lepra bacilli, which they think are derived from the peritoneal endothelial cells, for the bacilli

were also found in those of the peritoneal layer over the kidneys. The liver also shows enormous masses of leprosy bacilli with a tendency to soften in the centre. All the growths appear to be granulomatous in nature. The naked eye and microscopical lesions are illustrated by good plates.

L. R.

LITTLE (E. Graham) & HASSON (James). In England entstandener und mittele der Impfbehandlung geheilter akuter knotiger Aussatz. [**Acute Nodular Leprosy arising in England and cured by Inoculation Treatment.**].—*Wien. Klin. Woch.* 1927. Oct. 20. Vol. 40. No. 42. pp. 1319–1321. With 3 text figs.

This is the same case as that reported in the *British Medical Journal* a year ago, and reviewed, together with criticisms of the conclusions come to in this *Bulletin*, Vol. 24, No. 3, p. 212.

DE ALMEIDA (Theophilo). O papel da educação sanitaria na prophylaxia da lepra. (Trabalho apresentado ao 3o Congresso Brasileiro de Hygiene).—*Archivos de Hyg.* Rio de Janeiro. 1927. May Vol. 1. No. 1. pp. 175–185.

ARAUJO (Oscar da Silva). A prophylaxia da lepra e das doenças venereas no Brasil e a actuação do departamento nacional de saude publica.—*Archivos de Hyg.* Rio de Janeiro. 1927. Sept. Vol. 1. No. 2. pp. 195–253. With 40 figs. (1 map) on 29 plates.

AMOEBIASIS AND DYSENTERY.

AMOEBIASIS.

JAMES (W. M.). **Remarks on the Diagnosis of Intestinal Amoebiasis.**—*Fifteenth Ann. Rep. Med. Dept. United Fruit Company, Boston, Mass.* 1926. pp. 82-88. [11 refs.] Also in *Jl. Amer. Med. Assoc.* 1927. Oct. 29. Vol. 89. No. 18. pp. 1469-1472. [11 refs.] [Herrick Clinic, Panama, R.P.]

A worker in areas where *Entamoeba histolytica* infection is common, who wishes to diagnose correctly and treat the many varieties of "stomach trouble" which constantly present themselves, must be prepared to recognize amoebae in the stools and to differentiate *E. histolytica* from the three other amoebas often found, and often associated with it in the same stool—viz., *E. coli*, *Iodamoeba bütschlii*, and *E. nana*.

In this paper Dr. James' theme—insistent, clear and convincing—is that the correct diagnosis of histolytica infection is not a mere routine laboratory procedure, but one requiring training, patience, and a reasonable degree of skill. None has greater claims than he to be listened to on this subject; and it is significant that in 1927 he is to be found urging that it is not a problem of the trouble it takes, but one of correct diagnosis of a common and often chronic disease of the large intestine with protean symptomatology, and endorsing DOBELL'S (1919) dictum that if it cannot be made properly it should not be made at all.

Survey figures, for the most part based on examinations of old stools and not checked, as a rule, by search in permanent preparations, show that one examination uncovers about one-third of the actual number of histolytica infections present in a community; three examinations between one-half and two-thirds; and six examinations up to about 90 per cent.; an indefinite number of examinations may be required before the remaining 10 per cent. of infection is found.

The author states that his own figures to date show that in about one-half of his histolytica infections, excluding acute dysentery, only vegetative forms are found at any one examination, and these would have been lost in survey work. By using reasonably fresh material, and by the study of permanent preparations made from this—and it must ever be borne in mind that the smears cannot be allowed even the slightest touch of drying or the nuclei of the amoebae become distorted and broken up—he believes that in trained hands the percentage of positive observations in amoebiasis (not amoebic dysentery) can be raised on first examination to 75 per cent. The second examination, when the first has been negative, brings this up to 90 per cent. The figures are based on his own experience. Up to date in the study of permanent preparations from 250 patients, if the third examination had not disclosed a histolytica infection he has not found it in the fourth, fifth, sixth, or seventh examinations except very rarely. Moreover in a series of control smears from apparently normal patients, when the smears were negative in the first three examinations he had not found *E. histolytica* or other amoebas subsequently.

The variation in the number of amoebas, in both histolytica and other species' infections, from day to day is remarkable. In a given case on

one day amoebas are very numerous and easily found—on another day only prolonged search in permanent preparations will reveal them and the fresh specimen will often be entirely negative.

Both for finding amoebas and for their differentiation examination of permanent stained smears is therefore obligatory. Their preparation takes time, but is no more difficult than other routine histological and pathological work.

Dr. James has instituted an interesting control. In 1924 he made permanent preparations from a series of stools with positive protozoological results and sent them to various recognized authorities—with intent to find out whether such authorities would be in substantial agreement and also to check his own interpretation. Fifty slides from forty cases were sent, and data were received from WENYON ; HEGNER & BAUER ; ST. JOHN ; SCHULE ; and HAUGHWOUT. (All of the results, including his own in the fresh preparations, will be sent to WENYON for correlation). Up to date, taking observations in permanent preparations as criteria, *his percentage of error in the examination of fresh specimens, with especial reference to occurrence of E. histolytica, was too high for accurate clinical work.* There was however substantial agreement among all as to the finding of *E. histolytica* in the permanent preparations.

In perfectly fresh stools, the thoroughly trained and competent protozoologist can, as DOBELL (1919) stated, differentiate accurately between the five species of the intestinal amoebas of man. These specific conditions do not obtain for clinical and laboratory work in the tropics except, as yet, very rarely. To get suitable stool material KOFOID advocates use of bile salts or ox gall—and this does give good results. The author has found a mild laxative will serve in most cases. A soft stool, without purgation, is required. It is very difficult to make permanent preparations from liquid stools and a stool that contains material from high up in the bowel as well as from lower down is best. The largest numbers of amoebas are most often found after a mild laxative following one or two days of constipation.

The author concludes by describing the wet fixation of smears in Schaudinn's fluid and a method, devised by KOFOID, of preserving and packing the slides in alcohol for transportation.

H. M. Hanschell.

MUSSER (J. H.). *Amoebiasis*.—*Amer. Jl. Med. Sci.* 1927. July. Vol. 174. No. 1. pp. 1-8. [2 refs.] [Tulane Univ. of Louisiana & Charity Hosp., New Orleans.]

An interesting analysis of intestinal amoebiasis as seen in the Charity Hospital, New Orleans, during 1925. In that year 72 patients, from a total of over 25,000 admissions, were diagnosed as suffering from amoebic dysentery. In 21 of these amoebiasis was doubtful. In the 51 cases definitely diagnosed as amoebic dysentery one patient was 19, and one 15 years old ; 12 patients were between 21 and 30 years, 23 between 31 and 40 years, 9 between 41 and 50 years, 2 between 51 and 60 years, and 2 over 60 years. The disease thus appeared commonest between 31 and 40 years, very rare under 18 years, and " a clinical curiosity in a child." Of the 51, 46 were males and 5 females, and as would be expected in a Charity Hospital, all came from the lower walks of life. Only 14 were negroes. This is of moment, for the negroes' hygiene, or

rather lack of such, is decidedly more faulty than the white man's. Some racial immunity is indicated. [But does the negro of New Orleans seek hospital aid so readily as the white man ?]

Symptoms of onset. In 40 cases the complaint was diarrhoea. One case came because of increasing weakness, seven were admitted because of loss of weight, two because of rectal pain, and one because he thought he had bleeding haemorrhoids. Thirteen patients complained of abdominal cramps rather than of the accompanying diarrhoea.

Duration. Varied from 2 weeks to 30 years. In patients with symptoms severe enough to classify as dysentery, duration was up to one month. A history of diarrhoea for three, four, eight, ten, twelve years was common, and one case thirty years.

Repetition of attacks. One patient had his second attack 15 years after the first. Another in 15 years had 3 attacks. Another in 12 years had an attack every year for 4 years, in the other 8 years a mild diarrhoea about once a month. One man in 3 years had 10 attacks of diarrhoea lasting for one week. Another in 7 years had 15 attacks of diarrhoea and cramps.

Physical examination. In 21 cases tenderness and rigidity of abdominal wall. In 5 cases distension of abdomen, and in 5 cases enlargement of liver.

Proctoscopy in every one of the 51 cases revealed congestion of mucous membrane and ulcers covered with bloody mucus containing many amoebae.

Treatment. Yatren was apparently most successful; it was used in 24 cases, stovarsol in 7 cases, emetine and ipecac, alone and in combination with stovarsol, in the other cases. Emetine in 3 cases was followed by relapse. The author adopts the classification of Low and DOBELL: (1) carrier; (2) general amoebiasis; (3) amoebic diarrhoea; (4) amoebic dysentery; and discusses briefly each category. One may note that he quotes a personal communication of JOHNS that fresh duodenal contents have no effect on the cyst wall and that liberation of the encysted protozoa is probably through a process of autodigestion of the cyst wall under favourable circumstances. It is estimated that one in 20 who have amoebic diarrhoea or dysentery develops hepatic abscess. Classical symptoms of amoebic dysentery are so typical that a presumptive diagnosis may be made solely on the recital of the patient's story. Frequent stools, marked tenesmus, cramps, ineffectual desire to defaecate at frequent intervals. Stools contain little faecal matter, often nothing but blood and mucus, and amoebae in enormous numbers. The patient wastes very quickly. From the epidemiological standpoint the patient with acute amoebic dysentery, passing only vegetative forms of amoebae in his stools, is of no danger to his fellow man.

H. M. H.

DUNN (T. B.). *Amoebiasis*.—*China Med. Jl.* 1927. July. Vol. 41. No. 7. pp. 607–620.

A long paper, interesting, and clearly written, covering in detail practically the whole field of amoebiasis, and concluding with description of clinical cases and the author's own experiences in their diagnosis and treatment. No new ground is broken. It is worthy of note that he has found the chronic amoebiasis case to do well, not on restricted dieting, but on a diet rich in vitamins.

H. M. H.

COLE (J. C.). **Amoebic Disease.**—*New Orleans Med. & Surg. Jl.* 1927. Aug. Vol. 80. No. 2. pp. 81–84. [6 refs.]

An interesting though general review of the subject. The author states that unless one is familiar with the pathology of amoebic disease he cannot appreciate the difficulties sometimes experienced in getting a permanent cure through any one system of treatment. The line of attack must be directed toward amoebae in the tissues and those in the lumen of the gut. Emetine, stovarsol, and yatren have proven almost magical in controlling the active symptoms of amoebic infections. Periodic courses of these drugs should be given for at least one year. The healthy carrier should be treated in the same manner as the convalescent from the acute condition. Amoebic disease is not purely topical, but general and widespread. The term amoebic dysentery has dragged into disrepute the more dignified term amoebic disease, since the true dysenteric case is probably in the minority.

H. M. H.

GEHRCKE (Adolf). Die Amöbenerkrankungen des Menschen, insbesondere der Affektion des Intestinaltrakts und ihrer Komplikationen. Eine Studie in klinischer, ätiologischer und therapeutischer Hinsicht im tropischen Britisch- und Holländisch-Indien. [**Amoebiasis of Man especially Intestinal.**]—*Med. Klin.* 1927. Apr. 29 & May 6. Vol. 23. Nos. 17 (1168) & 18 (1169). pp. 637–640; 679–681.

———. Die Therapie der Amöbenerkrankungen des Menschen, insbesondere der Affektion des Intestinaltrakts und ihrer Komplikationen. Eine Studie in klinischer, ätiologischer und therapeutischer Hinsicht im tropischen Britisch- und Holländisch-Indien.—*Ibid.* May 20 & 27. Nos. 20 (1171) & 21 (1172). pp. 756–759; 795–798.

The author points out that whereas in the tropics malaria is a danger only in certain localities, amoebiasis is found everywhere, and ranks hardly below malaria as a cause of invalidism. In these papers human amoebiasis, especially that of the intestinal tract, is described and reviewed carefully and in detail under the headings—Primary localization of the amoeba; Incubation; Toxicity of the amoeba; Metastases; Purely toxic complications; Chronic intestinal amoebiasis; Ileocaecal lesions and appendicitis; Lesions of rectum; Causes of exacerbation and relapse of intestinal amoebiasis; Encystment of amoebae and its significance.

Treatment is fully dealt with under—Control of treatment by stool examination; emetine; yatren as “specific” for amoebiasis; stovarsol and allied arsenicals; dieting. Finally there is an interesting discussion of the relation of chronic intestinal amoebiasis to sprue, the dietary treatment of sprue, and the bearing of climate on these ailments. These papers contain what has been oft recorded, and so well known probably to most tropical practitioners. They constitute a thorough exposition of the subject of intestinal amoebiasis and a valuable guide to the clinician who must deal with the disease.

H. M. H.

BRUMPT (E.). Pluralité des amibes intestinales humaines à kystes à quatre noyaux. [**Plurality of Quadrinucleate Cysts of Intestinal Amoebae in Man.**—*Bol. Inst. Clin. Quirúrg.* Buenos Aires. 1927. Vol. 3. Nos. 21-25. pp. 835-860. [Also issued as *3a Reunión, Soc. Argentina Patol. Regional del Norte, Tucumán, Julio, 7, 8 y 10, 1927.* pp. 727-752.]

A critical review—interesting though (necessarily) long. The author concludes that :—

(1) Man can harbour in his alimentary canal three species of amoeba having quadrinucleate cysts. These are, in order of frequency, *Entamoeba dispar*, *E. Hartmanni* and *E. dysenteriae* [*histolytica*].

(2) *Dispar* has cysts 10-16 μ , exactly like those of *histolytica*. Injected intrarectally, and anus then sealed, into kittens, *histolytica* kills the kitten, and characteristic lesions are found in its gut : *dispar* on the contrary, even if producing a heavy infestation, infects the kitten but for a short time, and produces no lesions in the gut, the walls of which do not become thickened.

(3) In every country where amoebic dysentery and liver abscess is autochthonous, or imported, the haematophagous *histolytica* is identically pathogenic for man and kitten.

(4) *Histolytica* sets up, in 10 to 20 per cent. of cases, dysentery ; in others various intestinal troubles ; quite healthy carriers are rare.

(5) *Dispar* and *Hartmanni*, when very numerous, cause various slight digestive disturbances in man. There are healthy carriers of both, with normal stools.

(6) Numerous small epidemics in temperate climates demonstrate that change of climate brings about no change in virulence of the true dysentery amoeba.

(7) No one has shown that the cysts of the dysentery-amoeba lose their virulence in carriers who have long dwelt in cold countries ; the author has shown by direct experiment that virulence is in fact maintained in such carriers.

(8) The author recommends, besides statistical research, direct experimental infection of kittens with the cysts from carriers in countries where autochthonous amoebic dysentery is rare—in order to discover the frequency of *E. dispar* infection.

H. M. H.

FEDER (J. M.). **Intestinal Amebiasis from the Pathologist's Standpoint as related to the Clinical Picture.**—*Jl. Lab. & Clin. Med.* 1927. Feb. Vol. 12. No. 5. pp. 451-454.

The clinical pathologist's contribution by expert examination of faeces is necessary for accurate diagnosis of amoebiasis and for control of treatment. His part too is the detection of the carrier case. Hitherto a large percentage of infected cases has been missed by faulty technique in examination of stools. The author stresses the necessity for wet fixation and staining of specimens, and for the examination of several specimens. [Culture is not mentioned.] Improved sanitation, e.g., in Canal Zone, has been responsible for a sharp decline in the number of cases of amoebiasis. Intestinal amoebiasis is not a

tropical so much as a cosmopolitan disease. It is not necessarily accompanied by dysentery, and the vague case sans dysentery requires the most skilful stool examination.

Carriers constitute a vital factor in its spread. Amoebiasis is an extremely protean disease and every case of vague gastro-intestinal upset must be suspected of and examined for amoebiasis.

H. M. H.

TIXIER (L.), FAVRE (M.), MORENAS (E.) & PETOURAUD (Ch.). Amibe dysentérique et ulcerations cutanées. Etude histologique, parasitologique et clinique. Contribution au diagnostic des ulcérations cutanées chroniques. [**The Amoeba of Dysentery and Ulcerations of the Skin.**—*Ann. Dermat. et Syph.* 1927. Oct. 6th Ser. Vol. 8. No. 10. pp. 521–538. With 7 figs. [Hôtel-Dieu, Bact. Inst., Lyons.]

The authors are to be congratulated on this very thorough and interesting study of a rare skin lesion. Mercifully, they have spared us those slovenly annoyances—histological micro-photographs; on the contrary, they earn our thanks for embellishing their text with illustrations that do illustrate the microscopic anatomy of the lesions and the presence therein of amoebae, and really enhance the value of this contribution to dermatology.

Surface lesions of the skin caused by the dysentery amoeba have been hitherto rare. The literature contains very few records of it. It is known that there occurs sometimes ulceration of the skin of the abdominal wall around the opening on to the surface of a liver abscess. Extra-abdominal skin lesions due to amoebic infection are extremely rare.

The author's case was that of a peri-anal lesion in a patient suffering from chronic dysentery. The peri-anal ulceration had been present, slowly extending, for 6 years. It had resisted various medications and recurred after two surgical operations. The lesion, however, healed rapidly—in a few days—after emetine injections. In the pus from the ulcers many typical dysentery amoebae were found. The microscopical study of the lesions brought out two features (shown in the text figures). (1) The presence of microscopic punched-out ulcers in the epidermis, distinct from the large amoebic ulcers. For this sharply circumscribed entirely-microscopic ulcer, rich in amoebae, the name *Porodermie amibienne* is proposed. (2) The presence of colonies of amoebae deep down in the dermis, away from the surface ulceration.

The authors state that diagnosis of amoebic ulceration of skin cannot be made on the microscopic characters alone; the clinical history of the patient and especially the results of laboratory investigation are necessary. They think it probable that systematic search for amoebae in the pus of skin ulcerations of obscure aetiology will show that cutaneous amoebiasis more frequently occurs than is at present admitted. The interest in establishing the fact of amoebic ulceration of the skin is twofold—that of exact diagnosis, and that of bringing into play a therapy, rapid and complete.

H. M. H.

WRIGHT (Henry W. S.). **Extra Hepatic Surgical Amoebiasis.**—*China Med. Jl.* 1927. May. Vol. 41. No. 5. pp. 438-449. [5 refs.]

Besides hepatitis, and ulcerative colitis, which may go on to abscess formation, there are other conditions directly or indirectly caused by the *Entamoeba histolytica*, coming within the purview of the surgeon, which may require operative treatment.

(1) Infiltration of the wall of the gut secondary to amoebic ulceration. This infiltration may be so massive as to simulate tumour formation, and may also give rise to stricture.

(2) Chronic or subacute appendicitis as a sequel to amoebic infection of gut. In these cases motile or encysted amoebae are present in the stools.

(3) Perforation of amoebic ulcer. Peritonitis occurs also from infection through needle track, or rupture of liver abscess; or from slow pyogenic infection coming through thin but apparently intact base of an amoebic ulcer.

(4) Amoebiasis cutis—connected with sinus running down to liver, or around caecostomy wounds.

(5) Amoebic fever—slight fever and leucocytosis over a long period of time. Examination reveals amoebae or cysts in the stools and recovery follows on emetine treatment.

(6) Nephritis and cystitis—amoebae are found in the urine and the cases respond to specific therapy.

(7) Splenic abscess and gall bladder infection.

(8) Metastatic abscesses in lungs, brain and in the subcutaneous tissues.

(9) Irido-cyclitis—in patients the subject of chronic amoebic colitis, and supposed to be due to the toxins from the amoebae. In the early stage emetine cures the condition.

The author does not claim to have had personal experience of all of this extra-hepatic amoebiasis; but points out that in China, where amoebic dysentery is so common, a look-out should be kept for these obscure cases.

H. M. H.

FOSTER (J. H.) & FARNAM (W.). **Fever in Amoebiasis.**—*China Med. Jl.* 1927. July. Vol. 41. No. 7. pp. 621-626. [2 refs.]
[Hunan-Yale Hosp., Changsha.]

The authors in an interesting paper describe three cases in Europeans; in all fever was the cardinal symptom. In addition all had more or less colitis. In the stools of all amoebae or amoebic cysts were found, after many negative searches. In one of the cases there was involvement of the liver; this case eventually reacted well to emetine treatment, as did the other two.

The authors have not noted, as yet, this "amoebic" fever in any of the numerous cases of amoebiasis in their Chinese patients. They note that the occurrence of a persistent low fever without any definite physical signs in foreigners in China leads many physicians to suspect pulmonary tuberculosis. The three cases here cited emphasize the importance of ruling out amoebiasis before making a diagnosis of tuberculosis.

H. M. H.

D'AMATO (Hugo J.). *Entameba histolítica en el líquido duodenal.* [*Entamoeba histolytica in the Duodenal Contents.*—*Semana Méd.* 1927. June 30. Vol. 34. No. 26 (1746). pp. 1557–1563. [16 refs.]] ["Instituto Modelo" Clin. Med., Buenos Aires.]

A married woman, 20 years of age, complained of pain in the right hypochondrium and umbilical regions. One year previously she had had an attack of jaundice with choluria. Nineteen days before coming under observation for the present illness she had a definite attack of biliary colic; there was acholia with choluria, but no jaundice. In the faeces were cystic forms of *E. histolytica* and both vegetative and cystic forms were seen in the fluid removed by the duodenal sound. There was anaemia, red cells $3\frac{1}{2}$ million, haemoglobin 90 per cent., leucocytes "normal," 40 per cent. lymphocytes.

In the author's opinion, though the commonest route by which the amoeba reaches the liver is by the blood-stream, in the present case they ascended the intestinal tract; in the first attack the result had been "hepatogenous" jaundice with choluria, but not acholia, while in the second by ascending the duodenum the amoebae had set up a catarrhal angiocholitis, obstruction of the ducts and acholia with choluria but no jaundice, partly because of the efficient renal function and partly because of the brevity of the attack.

H. Harold Scott.

RAÚL GOYENA (Juan). Cancer del recto y amibiasis. [*Rectal Carcinoma and Amoebic Infection.*—*Semana Méd.* 1927. Sept. 1. Vol. 34. No. 35 (1755). pp. 542–547. With 2 text figs. [16 refs.]] ["Modelo" Inst. of Clin. Med. Buenos Aires.]

The author records the case of a man of 47, who suffered from diarrhoea, 6–14 stools daily, semiliquid, and at times containing pus and blood.

Entamoeba histolytica in cystic and precystic forms was found, but the condition did not clear up on the usual lines of treatment. Rectoscopy revealed a tumour with a little ulceration, and histological examination proved it to be adenocarcinoma. The inferences drawn are three: (1) That faecal examination should be carried out in all patients with symptoms referable to the lower bowel; (2) that, even if amoebae are found, rectoscopic examination should also be made; (3) that if a tumour is present, a portion should be submitted to histological investigation. [Practitioners cannot fail to agree with all of these.]

H. Harold Scott.

- i. FOWLER (Henry P.). *Report on a Case of Liver Abscess.*—*West African Med. Jl.* Lagos. 1927. Oct. Vol. 1. No. 2. p. 20.
- ii. GLOVER (W. E.). *Hepatic Abscess in an African.*—*Ibid.* July. Vol. 1. No. 1. p. 10.
- iii. McCULLOCH (W. E.). *Amoebic Abscess of the Liver cured by Emetine Injections.*—*Ibid.* pp. 10–11.

i. A native aged 45–50 years—eights months wasting, fever, sweating—for five months progressive enlargement of abdomen; dysentery 17 years previously. A large fluctuating tumour in upper abdomen extending downward to pelvis. Abdomen opened and "many pints" of anchovy-paste-like pus evacuated from "cystic" tumour in liver. Collapse and death 3 days later.

ii. Native policeman. Irregular fever, sweats, enlarged tender liver. Injections of emetine for 7 days procured no improvement. On 7th day exploratory needling revealed pus in liver. Abscess drained by open incision—two pints thick pus. Uneventful recovery. No amoebae had been found in pus or in stools.

iii. Native 55 years old—severe pain in epigastrium, great tenderness to palpation to left of middle line. Liver edge half an inch below costal margin and dullness upwards to left nipple. No tumour to be felt. No fever; pulse 92 per min. Later, fever developed and a tumour orange-sized appeared in left lateral vertical and transpyloric plane. Emetine gr. 1. injected. Exploratory needle drew off 16 cc. anchovy pus. In all 20 grs. emetine given. Uneventful recovery. No history of dysentery. Amoebae had been found in stools but none in the pus.

H. M. H.

MANSON-BAHR (Philip) & SAYERS (E. G.). **Recent Advances in the Treatment of Amoebic Dysentery together with an Account of the Sigmoidoscopic Appearances observed in Different Stages of the Disease.**—*Brit. Med. J.* 1927. Sept. 17. pp. 490-492. [4 refs.]

A résumé of treatment with accounts of illustrative cases. Emetine is still treatment of election in early stages of acute amoebic dysentery and for amoebic hepatitis. Some cases relapse and further treatment with emetine is often of no avail; the amoebae have become emetine-resisting. Chronic cases often do not respond well to emetine treatment. Many of the emetine failures were cured by emetine-bismuth-iodide. Of 40 cases treated with E.B.I. alone, 5 were not cured after full courses of E.B.I. and emetine periodide. The more acute the symptoms the more striking and permanent had been the effects of E.B.I. treatment. Emetine periodide has proved less satisfactory—out of 12 cases treated with it, 5 had to be treated later with E.B.I. to obtain permanent cure. Three patients relapsed after 9 courses of treatment with E.B.I.—entamoebae become resistant to this drug also. Though E.B.I. has procured an increased number of permanently cured amoebic dysenteries, there still remain many who, in spite of all known treatment, will eventually relapse. Such patients usually become neurasthenic. Emetine entails rather painful injection; and E.B.I. notoriously is likely to cause vomiting. A graver objection is the toxic effect of emetine—fall in blood pressure, cardiac irregularity, neuritis, desquamation of skin, mental depression—counteracted somewhat by more generous diet.

Yatren 105 can be given orally, rectally, intramuscularly, or intravenously. The usual dose by mouth, 15 grains thrice daily, causes diarrhoea; pills or cachets containing 4 to 8 grains thrice daily prove satisfactory. After cleansing rectum with 2 per cent. sodium carbonate enema, yatren 200 cc. 2½ per cent. solution is slowly run in and retained by patient for as long as possible. Patients learn to hold it for 8 hours or longer, proof of absorption being in testing urine with perchloride of iron; yatren produces a greenish colour. Yatren is given for 10 days by mouth with ten daily injections per rectum. After 5 to 7 days this course is repeated. Milk diet alone is quite unnecessary. No toxic symptoms have been observed by the authors or reported in the literature. It is claimed that yatren is a definite cell-stimulant. VOGEL has shown that yatren in dilution 1-100 kills all the *E. histolytica* in culture in 3 hours, and in 1-1000 prevents multiplication after 12 hours. The authors can fully confirm the efficacy of yatren in curing long-standing amoebic dysentery which has proved resistant to emetine and E.B.I. Several cases of amoebic hepatitis apparently cured by yatren have been recorded.

Yatren appears to be curative when lesions are in lower portion of large intestine, but patients sometimes relapse because of lesions in caecum and transverse colon. To meet this, the authors introduced what they believe to be treatment of election for resistant cases of amoebic dysentery—viz., *E.B.I. by mouth combined with yatren per rectum*. During 1926 this combined treatment was given to 22 cases, 3 grs. E.B.I. every night, and 200 cc. 2½ per cent. yatren solution in lavages per rectum, in the morning. It is well tolerated, vomiting is almost entirely absent and the usual E.B.I.-diarrhoea not observed. Out of a series of 153 proved amoebic dysenteries, these cases have been the most successful, especially if it is noted that most of the 22 were long-standing "intractable" cases. The authors discuss briefly the probable action of these drugs in combination treatment. Among other points continuous treatment day and night gives the parasite no chance to recuperate. Whatever the rationale of the treatment may be, the combined drugs are remarkably well tolerated, and results controlled by sigmoidoscope and backed up by clinical observations, have been very satisfactory.

H. M. H.

WALDORP (Carlos P.). Nuestro tratamiento de la amebiasis intestinal con píldoras queratinizadas y grafitadas de yatren y emetina. [**Intestinal Amebiasis treated by Yatren and Emetine.**—*Bol. Inst. Clin. Quirúrg.* Buenos Aires. 1927. Vol. 3. Nos. 21–25. pp. 226–231. [Also issued as *3a Reunión, Soc. Argentina Patol. Regional del Norte, Tucumán, Julio, 7, 8 y 10, 1927.* pp. 118–123.]

The author confirms the good results recorded from the use of yatren in amoebic dysentery. The employment of this *per os* in pill-form together with emetine subcutaneously sometimes gave even better results. He then gave the combination as pills in the following doses: 2 pills on the first day, 3 on the second, 4 daily for the next three days, 6 on the next two. If well tolerated, up to 8 might be given on the ninth and tenth days; if badly borne, only six. Each pill was of 20 cgm., and 46–48 were taken in 10 days. In every 10 gm. of the pill-mass there were 8.5 gm. yatren and 1.5 gm. emetine. A record of nine patients is presented in a table; in one there was early vomiting, and in one other nausea; with these exceptions the pills were well tolerated and the results are reported as being better than with either drug separately.

H. Harold Scott.

VAN STEENIS (P. B.). De behandeling van amoebendysenterie met emetine, yatren en stovarsol. [**Treatment of Amoebic Dysentery by Emetine, Yatren and Stovarsol.**—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1927. Vol. 67. No. 3. pp. 347–357. [11 refs.] [Military Med. Lab., Weltevreden, Java.]

Emetine hydrochloride in hypodermic injections is still indispensable in the treatment of amoebic dysentery because of its sterilizing influence in the tissues against the histolytic type of the amoeba, and consequent preventive action against metastatic abscesses. Dose; 30–60 mgm. daily, on 5 consecutive days, not more than once per month.

Yatren acts on the intestinal infestation, no matter whether histolytic or minuta type of the amoeba, or both, be present. It has no toxic by-effect or cumulative action, and its administration can therefore be repeated deliberately. Dose ; 3 gm. daily, during a week ; with 3-7 days rest between the separate courses. Diarrhoea caused by yatren, though harmless, is sometimes annoying.

Stovarsol is less effective against the histolytica type than emetine or yatren, but is very useful against the minuta stage of the amoeba. Dose ; 250 mgm. 3 times daily, during 1 week, continued in diminishing doses for about two months afterwards. No toxic effects were noted.

W. J. Bais.

HOUSIAU & DUWEZ (J.). De l'ipéca et succédanés dans l'amibiase intestinale. [**Ipecacuanha and its Substitutes in Intestinal Amoebiasis.**—*Bruxelles-Méd.* 1927. July 10. Vol. 7. No. 37. pp. 1138-1147. [Numerous refs.]]

This paper is a general, yet rather brief review, of the whole matter of the treatment of intestinal amoebiasis. The authors conclude that :

1. Emetine singly is a sufficient and effective cure for amoebic dysentery if given from the first onset of the disease.

2. It has little or no effect on cysts. If these be present, and in relapses, treatment should be by emetine + stovarsol, or yatren + emetine.

3. In patients with heart disease, enfeebled, or with gastric derangements, give intestinal lavage with yatren alone.

4. Laymen in the bush away from medical aid should take, from the onset of symptoms, stovarsol according to standard medical prescription, or bowel lavage with yatren.

5. Lacking these latter, then El Kossam (*Brucea sumatrana*) 50 cgm. of the powder in gelatine ; or Segond pills (ipécac. 0.40, calomel 0.30, extract opium 0.05) ; or Dover's powder.

H. M. H.

FONTANEL (J. P. J.) & MELNOTTE (P. E. M.). Thérapeutique et prophylaxie de l'amibiase. [**Amoebiasis, its Treatment and Prevention.**]—*Arch. Méd. et Pharm. Milit.* 1927. July. Vol. 87. No. 1. pp. 57-68. [1 ref.]

In an interesting paper the authors describe in some detail the treatment of amoebiasis in its various clinical phases and its prophylaxis. They advocate measures all already well-known and often used, which do not here call for further specification. As to prophylaxis, it is still in its infancy. It is impossible to-day, the authors think, to do more than try to sterilize those human beings who may show themselves as carriers of the parasites by definite symptoms of amoebiasis.

H. M. H.

SEIBERT (F. M.). **Treatment of Amebiasis with Stovarsol.**—*U.S. Veterans' Bureau Med. Bull.* 1927. Aug. Vol. 3. No. 8. pp. 770-773. [U.S. Veterans' Hosp., Fort Snelling, Minn.]

For two years the best results were obtained from the use of emetine hypodermically followed by a course of emetine-bismuth-iodide internally. If amoebae were still found in stools, 0.6 gram neosalvarsan

was given intravenously once a week for 6 or 8 doses. Often severe gastro-intestinal disturbance was noted after the emetine-bismuth-iodide, nausea, emesis, eructations and borborygmus, and it is doubtful if the neosalvarsan circulating in the blood stream had any marked effect upon organisms living in the intestinal wall or lumen of the intestine. Early in 1926 stovarsol was substituted for emetine-bismuth-iodide. Stovarsol was given by mouth in 0.25 gram doses t.i.d. for seven days, during which emetine hydrochlor. two-thirds gr. was given b.d. hypodermically. All medication was then stopped for three days, followed by salts every morning for six days, and the stools examined. If six stools were negative patient was discharged with advice to have stool examined again after 60 days. If stools were positive after the seven days' treatment, another course of stovarsol was given, but no emetine except in rare cases. By this treatment a much larger proportion of cases showed negative stools than after the E.B.I. treatment. Only four cases of over 300 treated with stovarsol developed mild rash, and this disappeared in one to three days after discontinuing the drug.

H. M. H.

VAN NITSSEN (R.). L'action des sels d'uranium dans certaines affections tropicales. [**Action of Uranium Salts in some Tropical Affections.**]—*Rev. Méd. et Hyg. Trop.* 1927. July-Aug. Vol. 19. No. 4. pp. 113-120.

The author's experience with this drug in rather a few cases of various tropical diseases leads him to conclude that :

Nitsol appears to have a specific action in amoebic dysentery. Given intravenously, 1 to 5 cc. in 1 per cent. solution every 48 hours. a course totalling 10-15 cc. generally suffices. In view of the toxicity of uranium it is wise to stop the treatment when the amoebae disappear, and not to go beyond the 15 cc. of nitsol.

Externally applied, salts of uranium have a definitely antiseptic action in tropical ulcer. Injected intravenously, of the four salts (uranium chloride, uranium nitrate, chloride of uranium and copper, and nitsol (double salt of sodium and uranyle)) the last is the least toxic. They bring about improvement and cure in cases of syphilis and yaws. They have no effect in recurrent fever and in malaria.

H. M. H.

JAKOBY (Curt). Ueber Spirocid bei Behandlung der Amöbendysenterie. [**Spirocid in the Treatment of Amoebic Dysentery.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1927. June. Vol. 31. No. 6. pp. 253-257.

The author points out the drawbacks to the use of emetine, yatren and stovarsol. Spirocid (4-oxy-3-acetylamino-phenyl-arsenic-acid) has been favourably reported on in the treatment of syphilis. Brief clinical description is given of 7 cases of dysentery thus treated. In 5, *Entamoeba histolytica* was demonstrated in the muco-sanguineous stools. In 2 of them, after emetine had failed to procure relief, spirocid therapy was followed by disappearance of symptoms, and in one where cysts had been present these disappeared. In another, with bloody mucous stools and enlarged tender liver, rapid disappearance of hepatic and intestinal symptoms followed on spirocid therapy. In the remaining

two cases spirocid treatment procured rapid "cure." Two other cases (*E. histolytica* not demonstrated) with mucous stools, enlarged tender liver, tenesmus and abdominal pain, were "cured" by spirocid treatment, one of them after emetine had failed. Spirocid was given in tablet form, 0.25 gm., two or three daily until symptoms subsided. The author admits that these cases are so few in number as to enforce caution in forming conclusions, but the advantage of an effective addition to the armamentarium against dysentery is obvious. [One may safely predict that spirocid, like stovarsol, will have its dermatitis.]

H. M. H.

BUCHMANN (Max). Zur Therapie der Amöbenruhr bei Kindern [**Treatment of Amoebic Dysentery in Children.**].—*Deut. Med. Woch.* 1927. May 27. Vol. 53. No. 22. p. 928.

A brief paper summarizing the author's experience in treating amoebic dysentery, in children, in Palestine. $2\frac{1}{2}$ mgm. emetine for each age-year is insufficient. He stresses the warning that effective dosage such as 0.04 gm. per age-year, owing to the cumulative action of emetine, is dangerous for weakened children. Fatal results are known. On the other hand he has not found any danger from yatren. It is a "specific" for amoebic dysentery, administered *per os*. It was effective also in cases of colitis, the aetiology of which was not accurately established by microscopical investigation. At first he used a 4 per cent. solution, 5–10 cc. daily to 6 months old, and 10–15 cc. to 12 months old children. This dosage he considers too high; it is best to begin with smaller doses, a 2 per cent solution, 1 cc. for each age-month. In older children this dose can be doubled.

H. M. H.

VAN STEENIS (P. B.). Enkele opmerkingen over de behandeling van het tropisch leverabsces (abscessus hepatis amoebicus). [**Treatment of Tropical Liver Abscess.**].—*Geneesk. Tijdschr. v. Nederl.-Indië*. 1927. Vol. 67. No. 3. pp. 358–368. With 1 chart in text. [12 refs.] [Military Med. Lab., Weltevreden, Java.]

Though there is no doubt that emetine alone can cure liver abscess' its uncertain action on intestinal amoebiasis makes the chance of relapse too high to trust to it only. Emetine therefore should be followed by yatren or stovarsol. Of four cases treated in this way, three were completely cured, one apparently relapsed. The author believes that hepatitis recurs not from amoebae in the abscess wall which have escaped action of emetine, but from a new invasion of tissue from the gut. Yatren and stovarsol show no direct effect on the liver abscess. If the liver remain definitely enlarged, notwithstanding emetine treatment ("dead abscess"), the pus should be evacuated by puncture, or by operation; for the latter local anaesthesia usually suffices.

W. J. Bais.

HODSON (V. S.). **Case of Amoebic Hepatic Abscess, treated as an Out-Patient with Emetine Only.**—*Proc. Roy. Soc. Med.* 1927. July. Vol. 20. No. 9. pp. 1334–1335 (Clinical Sect. pp. 70–71). With 2 text figs.

A man 39 years old—in June, 1926, dysentery in India—"successfully" treated with emetine. In England, in January, 1927, there began indefinite and slowly increasing illness. When examined April 1st, presented muddy complexion, temperature normal, limitation of movement of right chest,

slight prominence over liver area, impaired percussion note below angle of scapula, dullness beginning in front at 4th intercostal space in nipple line, breath sounds deficient, particularly behind, a few fine crepitations, no bronchial breathing, voice sounds not markedly altered. X-ray (April 1st) showed fixation of right diaphragm, with very definite upward enlargement of right hepatic lobe (skiagram illustrated). Patient was ordered emetine grain 1.0 for three days: 7 days later he said he had been increasingly able to work and omnibus riding no longer caused pain. X-ray showed diminution of right-lobe-bulge and some diaphragm movement. He was ordered emetine gr. 1.0 on April 8th, 9th, 10th and again on April 15th and 16th. On April 22nd free movement of diaphragm, percussion normal and breath sounds audible down to 11th rib behind. Skiagram (illustrated) on April 22nd shows right hepatic lobe almost normal in upward limit. Complexion, appetite, and general feeling of health were normal.

H. M. H.

SAUTET (J.). Recherches expérimentales sur quelques produits employés dans le traitement de la dysenterie amibienne. [**Experiments with Drugs employed in the Treatment of Amoebic Dysentery.**]—*Ann. Parasit. Humaine et Comparée*. 1927. Oct. 1. Vol. 5. No. 4. pp. 329–343. [17 refs.] [Parasit. Lab., Faculty of Med., Paris.]

Before his departure for South America, Professor BRUMPT asked the author to investigate the action of emetine on *Entamoeba dysenteriae* [*histolytica*] and *Entamoeba dispar* in culture.

Full details of this investigation are here given, of which the author's own résumé is as follows:—

1. *E. histolytica* and *E. dispar* cannot be distinguished in cultures by any difference in sensitiveness to emetine. The toxicity of this drug is the same for the species *in vitro*.

2. The action of various drugs on cultures of amoebae (*E. histolytica* and *E. dispar*) was studied.

The amoebae were killed in 24 hours by the following doses:—

Emetine	...	...	...	...	1/500–1/1,000.
Cephaline	...	...	...	...	1/50,000–1/75,000.
Ipecac	...	...	...	...	1/50–1/100.
Emetine-bismuth-iodide	...	...	...	...	1/500–1/100.
Stovarsol	...	...	...	...	1/600.
Yatren	...	...	...	...	1/200–1/400.
914	...	...	...	...	1/10,000–1/50,000
Iodine	...	...	...	...	1/600.
Sublimate	...	...	...	...	1/250

3. (a). Iodine is much more lethal for amoebae *in vitro* than the experiments with cultures show.

(b). Stovarsol appears to be more active in the presence of liver extract, than when added directly to the cultures.

(c). Emetine has a more rapid amoebicidal action in solution in serum than in ordinary aqueous solution.

H. M. H.

BÉTEAU (J. P.). A propos de la thérapeutique de l'amibiase. [**Treatment of Amoebiasis.**]—*Rev. Méd. et Hyg. Trop.* 1927. Jan.–Feb. Vol. 19. No. 1. pp. 18–21.

The author reports favourably on the use of a compound of iodide of bismuth, quinine, and arsenic (Robert & Carrière), Tri-Iodo-Ercé, an intramuscular injection of which compound is given every two or three days.

H. M. H.

YORKE (Warrington) & ADAMS (A. R. D.). **Amoebic Dysentery.**
I.—Investigations into the Life-History of *Entamoeba histolytica*.—
Brit. Med. J. 1927. Sept. 17. pp. 486–490. [16 refs.]

A critical and comprehensive restatement and review of their own, and various other workers', experimental and clinical observations, bearing on points in the life-history of the parasite, of clinical, and especially of epidemiological, importance. Until recently it was believed that animals could be infected only by feeding on the cysts, or by injecting active amoebae into the large intestine. Certain investigations (1914–1919) on excystation suggested that cysts would hatch only after being acted on by gastric and pancreatic juices. DARLING's work (1913) had however not been noted. He described gradual disappearance of cysts from moist chamber preparations of heavily infected faeces, and also development of amoebulae within, and their emergence from the cysts. DOBELL and LAIDLAW (1926) initiated cultures from *E. histolytica* cysts passed in faeces. They stated that "Cysts just passed in stools do not hatch, or develop further, if placed immediately in culture media and incubated at 37° C.; they merely die. They must first be allowed to cool, and then must be kept for a certain time"—approximately 2 days outside the body was required for "maturation." This was epidemiologically important, for it implied that faeces of chronic amoebic dysenterics were not infective for one or two days after being voided. The authors describe their reinvestigation of this subject.

These experiments led to the conclusions that cooling outside the body was not essential for development of cysts or for excystation; usually most of the cysts were alive, but an appreciable number—probably of quadrinucleate type—were dead, at time of passage of faeces; and that, as the relatively poor hatch obtained from cultivation of freshly passed faeces could not therefore be due either to necessity for cooling outside body, or to majority of cysts being dead when passed, it must be result of something in faecal material itself which, while not preventing development of the cysts, did inhibit their excystation. DOBELL and LAIDLAW claimed that only the completely developed cysts survived cooling outside the body, thus raising a point of practical importance, by implying that a stool in which uni- and bi-nucleate forms predominated among the cysts, was relatively only slightly infective after it had been passed for a short time. The authors' experiments show that cooling the faeces to 0° to 5° C. for one or two days had no appreciable effect on either the immature or the mature cysts. Further experiments (here described) confirmed that presence of faeces, or of faecal extracts, in the culture tubes, had a definitely inhibitory action on excystation, although it did not prevent development of uni- and bi-nucleate into quadri-nucleate stage. The authors describe their further experiments which showed that *E. histolytica* cysts began to die fairly rapidly in faeces which had been kept at 16° to 20° C. for three or four days, and all were dead after 10 days; approximately the same results if kept at 0° C. in ice-chest.

In freshly passed stools placed at once in incubator at 37° C. the cysts were nearly all dead in less than 24 hours; sometimes but few cysts survived longer than 10 hours. Washed suspensions of the cysts in water lived longer, especially if stored at 0° C., but even here live cysts were not found after three weeks. *E. histolytica* cysts survived temperature 45° C. for 30 mins., but were killed within 5 mins. at

50° C. The cysts were remarkably resistant to emetine and yatren, and relatively so to HCl and Cl₂; the last-named in strengths far in excess of that used in bacteriological sterilization of water had no effect on the cysts in half an hour. The authors' investigations indicated that cysts did not hatch in the body of the hosts in which they were formed.

They cite clinical and experimental observations to show that mature quadrinucleate cysts developed from the precystic stage, in the gut, in 6-8 hours' time; and that the whole cycle from precystic stage, through mature cyst, to excysted quadrinucleate amoebae could be passed through in 12 hours. If this happened in bowel large numbers of cysts would be constantly hatching and wasted. There was much evidence to show that this did not happen: thus, the authors had never found in stools any of the characteristic recently-excysted amoebae with their four closely-agglomerated nuclei; and although development proceeded apparently uninterruptedly to formation of mature cysts, these did not hatch in bowel, possibly partly owing to lack of sufficient moisture in rectum, but mainly because of presence in faeces of something which inhibited excystation. They cite clinical and experimental data to show that mature quadrinucleate cysts remained viable in bowel for generally not more than a day or two at most. Obviously there may be essential difference between large intestine of man and of kitten; contents of the latter's rectum may not have same power of inhibiting excystation. Then, again, in SELLARDS and THEILER's experiments, fluid was introduced into kitten's rectum—and fluid is essential for excystation.

Yorke and Adams declare their belief that the sole purpose of the cyst formation in *E. histolytica* infections is propagation of parasite from one host to the next; and that Nature has devised a method of safeguarding this, and of preventing the wastage which would result if hatching of cysts occurred in intestine in which they are formed.

H. M. H.

DOBELL (Clifford). **Further Observations and Experiments on the Cultivation of *Entamoeba histolytica* from Cysts.**—*Parasitology*. 1927. Sept. Vol. 19. No. 3. pp. 288-313. [11 refs.] [Nat. Inst. Med. Research, London, N.W. 3.]

The author states that it is probable that cultures were first made from the encysted forms of *E. histolytica* by BOECK and DRBOHLAV in March, 1924. Though not first in the field, he claims for himself and LAIDLAW priority over YORKE and ADAMS in the discovery how to cultivate *E. histolytica* and several other entozoic amoebae from cysts (Dec. 1924).

The present paper, he states, is an elaboration of the work previously reported in conjunction with Dr. P. P. LAIDLAW. The experimental observations here given are fully reported and discussed and the author concludes that :—

(1) Under artificial (cultural) conditions, the free amoebae of *E. histolytica*—both human and simian strains—may survive at ordinary room-temperature up to 3 days: but there is no evidence that they can ever live longer. At 37° C. however, under like artificial conditions, some may survive for 5 weeks.

(2) Cysts of *E. histolytica* can remain alive at room temperature for any time up to at least 37 days, though they usually die within a few days if kept continuously at body temperature.

(3) At room temperature, the amoebae of *E. histolytica* are usually killed by exposure to N/20 HCl for only a few minutes. Isolated individuals, however, may withstand such treatment up to 20 minutes, though none survive for more than half an hour. But at 37° C. individual amoebae may survive exposure to N/20 acid up to one hour, though the majority are killed much sooner.

(4) The cysts of *E. histolytica* can hatch, and produce normal, viable, and readily cultivable amoebae, if kept continuously at 37° C. from the moment when they reach maturity. Previous cooling is not necessary to induce excystation and under artificial conditions cysts are able to continue their development immediately—without any period of rest intervening.

(5) En- and ex-cystation can take place in the same surroundings. Under cultural conditions the cysts of *E. histolytica* can hatch, and the resultant amoebae can develop in the same environment as that in which they were formed.

H. M. H.

FRASER (Neil D.). **Amoebic Dysentery. The Laboratory Examination of Dysentery Stools for *Entamoeba histolytica*.**—*China Med. Jl.* 1927. Sept. Vol. 41. No. 9. p. 801.

A description of a simple method of picking out amoebae :—

(1) Work a little of the faecal matter into a drop of normal saline solution in centre of slide.

(2) Cover with cover slip.

(3) Using low power ocular and 1/3 objective focus by means of coarse adjustment screw.

(4) Close shutter to cut off all bright light and focussing by fine adjustment screw pick small bodies which appear as bright "stars." (Bubbles also appear as bright stars but one soon learns to disregard them—careful placing of cover glass avoids bubbles and confusion). Having centred a star, open the shutter, turn on the 1/6 objective, focus and examine morphological character. If no amoebae or cysts found, then turn to the 1/3 objective and try again. In this way the whole smear can be quickly examined.

H. M. H.

CRAIG (Charles F.). **Observations upon the Hemolytic, Cytolytic and Complement-Binding Properties of Extracts of *Endamoeba histolytica*.**—*Amer. Jl. Trop. Med.* 1927. July. Vol. 7. No. 4. pp. 225–240. [11 refs.] [Army Med. School, Washington.]

The technique of this research and the discussion of results cannot in fairness be condensed into any useful abstract. The author's own conclusions are :—

" 1. There were present in the absolute alcohol extracts of forty-eight-hour-old cultures of *Endamoeba histolytica* hemolytic, cytolytic and complement-binding substances.

" 2. The hemolytic properties of such extracts were destroyed by heating the extracts to 80° C. in a water bath for one hour.

"3. The hemolytic substance was soluble in absolute alcohol and practically insoluble in normal salt solution.

"4. The hemolytic substance was not an exotoxin, as it was not present in the supernatant fluid of cultures of *Endamoeba histolytica*.

"5. The hemolytic agent was only present in the living organism, as extracts of old cultures containing no living amebae possessed no hemolytic properties.

"6. The hemolytic agent was not specific for human red blood corpuscles but was equally hemolytic to rabbit and guinea pig erythrocytes.

"7. The extracts did not contain any bacteriolytic substance.

"8. The complement-fixing substance contained in the extracts was apparently specific for *Endamoeba histolytica*, the blood sera of individuals harbouring other amebae giving negative reactions with these extracts."

[This last finding is of obvious and immediate clinical import.]

H. M. H.

BACILLARY DYSENTERY.

KALIC (Dimitrije). **A Comparison of Three Different Systems of Classification of Dysentery Bacilli: English, German and Japanese.**—

Jl. Path. & Bact. 1927. Oct. Vol. 30. No. 4. pp. 593-601.

[13 refs.] [Lister Inst. of Preventive Med., London.]

Many classifications of the dysentery bacilli have been given and when these differ in different countries there is apt to be confusion of terminology. The author has made careful comparison of strains representing types in different classifications. All the original type strains of ANDREWES, which represent the English subdivision were still available—V Oxford Flexner, V₂ Mason, W Cable, W₂ Mountain, X Hughes, Y original Hiss and Russell, Z Whittington. It was not possible to obtain the German B, C, F and G types of KRUSE. Of the Japanese types of AOKI, VI was rough, while VII and XI are considered not to belong to the dysentery group and IX was not obtained. Tests used for establishing identity were cross agglutination, cross absorption, fermentation and acid agglutination. The following useful table is given embodying the results of the investigation:—

Andrewes' types.	German types. (Kruse).	Japanese types. (Aoki).
V	B? or C?	—
V ₂	A	—
W	—	—
W _x	—	—
X	—	II
Y	D	I
Z	H	X
(Shiga)	(Shiga-Kruse)	VIII (Shiga)
—	—	III & V
—	—	IV
—	E (Sonne)	—

W. F. Harvey.

CASTELLANI (Aldo). **The Classification of Bacterial Dysenteries and of Dysentery Bacilli.**—*Fifteenth Ann. Rep. Med. Dept. United Fruit Company, Boston, Mass.* 1926. pp. 89–103. With 6 figs. [12 refs.] Also in *Amer. Jl. Trop. Med.* 1927. July. Vol. 7. No. 4. pp. 199–216. With 1 text fig. [12 refs.]

This is a combined clinical and bacteriological classification. The bacterial dysenteries are separated into the three groups: (1) *Bacterial dysentery sensu stricto* due to organisms fermenting neither lactose nor mannite and not clotting milk (Shiga-Kruse bacillus). (2) *Paradysentery* due to organisms which do not ferment lactose and do not clot milk, but ferment mannite (Flexner, Hiss, Russell, etc.). (3) *Metadysentery* due to organisms which either ferment lactose and clot milk, or ferment lactose and do not clot milk, or do not ferment lactose but clot milk (*Dysenteroides* and *Lankoides* genera). The author suggested this classification some years ago, but it has received very little attention. [The reason for this neglect would seem to be that bacteriologists are not yet prepared to accept the differentiation of the dysentery organisms into rigid species. The Shiga-Kruse bacillus is well characterized, but the relationships of the mannite fermenting organisms to the Shiga-Kruse bacillus and to one another are still in a very fluid state.]

W. F. Harvey.

CASTELLANI (Aldo). **Notes on the Aetiology of Certain Cases of Recurrent Diarrhoea and Certain Obscure Forms of Colitis due to Bacteria of the Metadysentery Group.**—*Jl. Trop. Med. & Hyg.* 1927. Nov. 15. Vol. 30. No. 22. pp. 285–294. [17 refs.] [Ross Inst. & Hosp., London, & Tulane Univ., New Orleans, U.S.A.]

The "metadysentery" group of the author comprises bacilli somewhat related to those of the true dysentery group: they do not produce gas in any sugar, but either produce acidity in lactose media or clot milk or do both. There are several clinical conditions, acute or chronic, in which organisms of this group have been found. Diagnosis is difficult, as bacteriological examination of the stools may be negative and require repetition before metadysentery organisms are found. The blood of chronic cases usually agglutinates the organism isolated from the stools.

W. F. Harvey.

WISEMAN (W. R.). **Unusual Dysenteric Infections. With Addendum.**—*Jl. of Hyg.* 1927. July. Vol. 26. No. 2. pp. 187–197. [10 refs.] [Public Health Lab., Glasgow.]

The reports which are now being made on the presence of SONNE's group III dysentery bacillus in Great Britain and elsewhere show that its distribution is probably a wide one. In this paper, clinical data are given of cases from which the organism was isolated, and show how very varied the symptoms may be and how often the cases are sporadic in their appearance. A full series of characters of the various test organisms was investigated and comparisons made with known Sonne dysentery strains. All of them showed fermentation of lactose in 7 to 9 days and produced acid and clot in litmus milk in from 11 to 22 days.

For the serological tests, formolized veal broth cultures were found to be much more satisfactory than formolized emulsions from agar. A difficulty which may prevent the bacteriological diagnosis of cases is this, that the organism may be inagglutinable by the patient's serum and by immune sera until it has been subcultured for some time. Other characters then, such as the heavy sedimentation of the growth in the peptone water fermentation fermentation tests, the tendency to bipolar staining and formation of a few filamentous forms and the agglutination of stock Sonne III bacilli by the patient's serum may be required to obtain a more rapid diagnosis.

W. F. Harvey.

WARREN (S. H.). **An Outbreak of Illness caused by *B. dysenteriae* Flexner.**—*Lancet*. 1927. Sept. 3. pp. 494–495. [College of Med., Newcastle-upon-Tyne.]

The illness was entirely confined to two families living together in a two-roomed flat, sharing the same scullery and W.C., but cooking and eating separately. Of the seven people involved four suffered from acute dysentery or diarrhoea. The illness proved fatal in 2 cases, 6 years and 2 years old. The bacillus isolated in all four cases invariably gave the reactions and showed the general characters of *B. dysenteriae* Flexner—in one of the cases it was isolated (post-mortem) from brain, liver, spleen, stomach and intestine.

H. M. H.

ALBERT (Jose) & QUIASON (Jaime O.). **Clinical Features of a Recent Epidemic of Bacillary Dysentery.**—*Jl. Philippine Islands Med. Assoc.* 1927. July. Vol. 7. No. 7. pp. 246–250. [5 refs.] [Coll. of Med., Univ. Philippines.]

1. The authors' cases in the pediatrics clinic of the Philippine General Hospital occurred simultaneously with outbreaks in several other parts of the Archipelago.

2. The disease attacked several members of the same family at the same time, children succumbing more easily than adults—the younger the child the graver the prognosis.

3. The epidemic was due mainly to *B. dysenteriae* Flexner.

4. Starvation diet should not be unduly prolonged. The appetite is a good guide for early institution of liberal diet and foretells recovery.

5. Recrudescences are not due to indiscretion in diet.

6. Specific serum treatment was disappointing.

7. The epidemic, May to October, 1926, gave a mortality of 31·6 per cent. in 136 cases.

H. M. H.

LEUCHS (J.) & PLOCHMANN (E.). **Zur Frage der Ruhrerreger. [On the Causal Organisms of Dysentery.]**—*Cent. f. Bakt.* I. Abt. Orig. 1927. Oct. 31. Vol. 104. No. 5-6. pp. 347–355. [2 refs.] [State Bact. Research Inst., Würzburg.]

It had been a common experience of the authors to isolate from dysentery stools organisms which morphologically, culturally and in

sugar reactions were identical with strains of the Y-Flexner group and yet did not agglutinate with the serum of that group. They instituted a comparison between their strains and the A to J types of KRUSE and the types E and D of ELKELES together with the corresponding sera. Some of the authors' strains were agglutinated by the E antisera of KRAUS and ELKELES, but partially and in fine granular form, contrasting markedly with the loose flocculent precipitate given by their own serum. It was then noticed that two sorts of colonies were given by their own strains on China blue agar. The one colony (*g*) was arched, glossy and had a smooth edge, the other (*fl.*) was flat, dry and more or less lobed. The colonies developed from a "*g*" type might be either *g* or *fl.* forms, those from "*fl.*" colonies were only *fl.* in type. Agglutinating sera were prepared from 24-hr. old colonies, which were at that stage characteristic, and less liable to contain a mixture of type. The *g* serum agglutinated mixed and *g* colonies in large clumps to 1-1,000 and *fl.* colonies in small granules, but only to 1-100. The *fl.* serum did not agglutinate or only in slight degree the *g* colony type but agglutinated finely the *fl.* colonies and the KRUSE-ELKELES E strains in 1-4,000. It also agglutinated such mixed colonies as gave rise to a large proportion of *fl.* colonies. The authors conclude that the E sera of KRUSE and ELKELES are sera to *fl.* colonies and could only pick out this type. The corresponding E strains also produce none but *fl.* colonies. Their own organism is an E strain of dysentery which has been shown capable of dissociating into spherical and flat colony types. The importance of this observation lies in this that it explains how a serological examination in cases of clinically certain dysentery may be negative; for it is the spherical colony which appears most commonly on plates from the stools. If sera are used which have been derived from colonies consisting of organisms which give rise for the most part to the *g* type of colony, then the proportion of positive findings becomes definitely increased.

W. F. Harvey.

LESTER (Vera). **A Study of the Lactose Fermenting Dysentery Bacilli (Sonne's Group III).**—*Acta Path. et Microb. Scandinav.* 1926. Vol. 3. No. 4. pp. 696-710. [14 refs.] [State Serum Inst., Copenhagen.]

The first classification of dysentery bacilli, by HISS, was largely based on sugar reactions and separated the 4 races, Shiga, Flexner, Strong and Y. Of these the Shiga bacillus does not ferment mannite. The other three ferment mannite and are variously called the Flexner, the pseudodysentery and the paradysentery group. This group ferments glucose and mannite in less than 24 hours but fresh strains never ferment lactose during the first 24 hours. Serum reactions have been applied for the differentiation of the mannite fermenters, but only one strain shows a high degree of serological distinctness without overlapping: it is Sonne's group III strain. According to SONNE the strains of this group are the cause of diarrhoeic diseases especially in children. Thirty one strains have been isolated by the author from about 2,000 stools. These strains were obtained from very small outbreaks, of 1 to 5 persons. The symptoms were a mild diarrhoea with moderate fever and mucus, sometimes blood, in the stools.

Fermentation reactions were carried out in sugar-free broth containing $\frac{1}{2}$ per cent. sugar, with reaction pH7.5 and brom thymol blue indicator. All the paradysentery bacilli have the following features in common: fermentation of glucose and mannite in 24 hours, but no fermentation of adonite, dulcitate and salicin. Sonne's group III has, as special characters, the early fermentation of rhamnose, 1-arabinose, maltose and the late fermentation of lactose and d-arabinose with inability to ferment sorbite. In this research attention was also paid to serological reactions. For agglutination 12-hr. agar cultures, suspended in normal salt solution containing 1-500 formalin, were used and readings were taken after 18 hrs. at 45° C. Great variability was found in the serological properties of group III strains: a strain might be agglutinated one day to full titre, and the next day be quite inagglutinable. This occurred both with fresh and old strains and the explanation given by the author is the tendency they had to dissociate into variants whose agglutinability varied in all degrees. As regards fresh cultures, a table is given showing that all the strains examined, even those agglutinating weakly at first, were agglutinable to full titre after 6 to 10 subcultures. None of the strains belonging to group III showed agglutination with sera of other groups to any high degree. The author concludes that the group is well characterized by its serological as well as by its biochemical reactions and that the biochemical reactions are the more constant and clearly defined.

W. F. Harvey.

PATTO (J. Ortiz). Sur des variations curieuses d'un bacille du groupe Flexner-Hiss. [**Curious Variations in a Bacillus of the Flexner-Hiss Group.**]*—C. R. Soc. Biol.* 1927. Oct. 21. Vol. 97. No. 27. pp. 1084-1086. ["Vital Brazil" Inst., Niteroi, Brazil.]

In a 1 per cent. maltose Hiss serum water medium with phenol red indicator this organism was found to give slight acidification in 24 hrs., which, however, had totally disappeared again in 72 hrs. Different concentrations of sugar were tested with the following results: No acidification in 72 hrs. with 0.2 per cent. maltose; slight acidification in 0.4 per cent. concentration after 24 hrs. and return to original in 48 hrs.; definite acidification in concentrations of 1, 2 and 4 per cent. with partial coagulation and return again to original in 72 hrs.; commencing acidification at 6 per cent. concentration from the 3rd hour, which became complete, with coagulation in 24 hrs., with reversion towards alkalinity in 72 hrs. Similar tests with Y-Hiss-Russell and Flexner Oxford strains of the Lister Institute showed that the former did not ferment maltose at any concentration, whilst the latter gave fermentation from concentrations of 1 per cent. onwards. In the matter of serum tests it is observed that neither anti-Schmitz nor anti-Sonne serum had any appreciable agglutinating action on the organism. With anti-Y-Russell serum on the other hand it agglutinated to titre and also with anti-Flexner-Oxford serum but not to titre. Absorption tests, again, differentiated the test organisms from both Y-Russell and Flexner. This organism then, is an intermediate type, approaching the Flexner in fermentative characters and related to the type Hiss in agglutinating character.

W. F. Harvey.

PATTO (J. O.). [Sobre uma variacao anomala de um pseudo dysenterico do grupo Flexner-Hiss.] [**Anomalous Variation in an Organism of the Flexner-Hiss Group.**]—*Arch. do Inst. Vital Brazil.* 1927. Apr. Vol. 4. p. 91. [Summarized in *Bull. Inst. Pasteur.* 1927. Aug. 15. Vol. 25. No. 15. pp. 673-674.]

The organism fermented glucose and mannite but not lactose nor saccharose. Litmus maltose media showed first an acid change and then became alkaline in 48 to 72 hours. Acidification is proportional to the concentration of sugar but the medium ultimately becomes alkaline whatever the concentration. This organism in its action on maltose resembled the Flexner bacillus and in agglutination reaction the bacillus of Hiss. The author calls it Y3.

W. F. Harvey.

WOLFF (J. W.). Serologische groepeerings van Pseudo-dysenteriebacillen, gekweekt bij gevallen van Bacillaire Dysenterie in Deli. [**Serological Grouping of Pseudodysentery Bacilli cultivated from Cases of Bacillary Dysentery in Deli.**]—*Ned. Tijdschr. v. Hyg. Microbiol. en Serologie.* 1927. Vol. 2. No. 1. pp. 44-69. With 7 graphs.

The study which is here set out has been carried on since 1922, but refers in particular to about 1,100 strains isolated between 1924 and 1926. These have been carefully compared by cross agglutination and absorption tests with the groups of Y-Flexner bacilli described by ANDREWES and INMAN in the Medical Research Council Special Report Series No. 42, 1919. By far the commonest of the pseudodysentery organisms isolated was the Deli strain Y25, which corresponded absolutely with the London strain W. Its percentage frequency was 37·6, as compared with, Y28 and F1·7 (London Z-Y) 22·2, Y29 (London V) 8·2, F1·10 and F1·30 taken together 2, F1·35 (? London X) 3·2, and inagglutinable strains 26·8. The Y25 (W) group was by far the most constant serologically and clinically, while other groups seemed to be less stable in character. Pure London X strains were not found in Deli, nor were pure single Z and Y strains.

W. F. Harvey.

PICKWORTH (F. A.). **Agglutination of Typhoid and Dysentery Organisms by the Sera of Mental Hospital Patients.**—*Jl. Path. & Bact.* 1927. Oct. Vol. 30. No. 4. pp. 627-640. With 13 figs. [69 refs.] [Research Labs., Hollymoor, Northfield, Birmingham.]

The sera of about one-quarter of the inmates of mental hospitals show positive agglutination reactions to typhoid and dysentery organisms. These reactions are exhibited almost to an equal degree by these patients on admission and after a sojourn in hospital, so that it cannot be argued that they developed as a result of infection during their residence. [It would have been interesting to have an indication of the degree to which sera of patients of other than mental hospitals, and of similar age and sex distribution gave similar reactions.] The tempting explanation of the high degree of the reactions is put forward, that they are due to an unsuspectedly large number of past infections with the specific organisms which are perhaps trivial, chronic and unnoticed but lead to the production of agglutinins. Such infections may

even be causally related to the mental disorders from which the patients tested suffered. If this thesis can be sustained it is obvious that specific agglutination reactions would have to be regarded as suggesting the possibility of past infection, quite apart from evidence of the occurrence of clinical disease.

W. F. Harvey.

YAOI (Hidetake) & YEJIMA (Shimpei). **A Critical Investigation of Torikata's So-called "Koktigene" especially the Dysentery-Koktigene.**—*Scientific Reports Govt. Inst. Infect. Dis.* Tokyo. 1926. Vol. 5. pp. 209-219. With 2 charts in text. [1 ref.]

Dysentery bacilli were used belonging to the exotoxigenic and endotoxigenic groups. Suspensions in normal salt solution of a strength of 4 mgm. per cc. were boiled for 30 minutes to provide the koktigen while the control suspensions, of a strength of 2 mgm. per cc., were heated at 53° C. for 60 minutes. In the experiments the different antigens were inoculated intravenously in rabbits and the sera furnished tested for agglutination titre and antibacterial power. The results of the experimentation were that : (1) the suspensions after boiling had lost toxicity for mice to the extent of one fourth and retained fairly good immunizing power ; (2) the supernatant fluid of centrifuged boiled suspensions, the so-called " Koktigen of Torikata " had about one-tenth the toxicity of the original suspension ; (3) the koktigen obtained from the endotoxigenic group of dysentery bacilli proved unreliable as antigen, whereas that from the exotoxigenic group acted as a fairly good immunizing agent.

W. F. Harvey.

SCHLOSSBERGER (H.) & WICHMANN (F. W.). Untersuchungen über die Bindungsverhältnisse von Dysenterietoxin und Dysenterie-antitoxin. [**Combining Proportions of Dysentery Toxin and Antitoxin.**]—*Ztschr. f. Hyg. u. Infektionskr.* 1927. July 25. Vol. 107. No. 3-4. pp. 716-724. [32 refs.] [State Inst. for Experm. Therap., Frankfurt a.M.]

The summary of the work of the authors is as follows :—

1. Increasing quantities of dysentery toxin require for neutralization, not proportionally increasing amounts of antitoxin but larger amounts. Thus while 1/1,000 cc. of the German standard dysentery serum neutralizes 1/44 cc. of bouillon toxin, it requires 1-36 cc. serum to neutralize only 1/14 cc. toxin. The same phenomenon is evident in the neutralization of a dried dysentery toxin preparation.

2. From determinations of the amounts of antitoxin required for neutralization of increasing quantities of any given dysentery toxin preparation, it must be concluded in this case, as in that of diphtheria, that any such preparation contains variable quantities of toxin and toxoid, with different affinities for the specific antitoxin.

3. The observation that 30 times the quantity of antitoxin needed to neutralize a single unit of dysentery toxin, was required to neutralize only 3 units of the same toxin is explainable on the ground that the toxin-antitoxin mixture undergoes a partial dissociation in the body, which necessitates this use of an excess of antitoxin.

4. It follows that exact titration of dysentery sera is only possible on the basis of the use of a standard serum. An arbitrarily fixed quantity of the standard serum, which must be adhered to, is used for the titration of the toxin preparations employed in testing sera.

W. F. Harvey.

CASTELLANI (Aldo). **Further Observations on the Action of Bacilli of the Paratyphoid, Dysentery and Metadysentery Groups on Various Starches.**—*Jl. Trop. Med. & Hyg.* 1927. Sept. 15. Vol. 30. No. 18. pp. 229–230. [2 refs.]

Starches from 15 different sources were used and the results as regards acid formation were tested. Solution of a starch is seldom complete and the so-called "soluble starch" is really one rendered soluble by a special process. Readings were taken after 3 weeks at 37° C. With the strains which were available, it was found possible to differentiate, by means of their starch reactions, between *B. paratyphosus* A, B and C, between Shiga, Flexner and Y dysentery and between *B. ceylonensis* A and B. It remains to be seen whether this result holds good for all strains of these organisms. Moreover, if it does, the reaction can be used for the identification of the source of a particular starch.

W. F. Harvey.

PONOMAREFF (A. W.). Quelques conditions de l'action sur l'organisme des sérums antidiphthérique et antidysentérique. [**Conditions of Action of Antidiphtheritic and Antidysenteric Sera.**]—*C.R. Soc. Biol.* 1927. July 22. Vol. 97. No. 24. pp. 505–506. [1 ref.] [Inst. of Experim. Med., Leningrad.]

The theoretical consideration underlying this work, given by the author in a recent publication relating to antirabic serum, is that antisera do not come in contact with cerebral tissues until the "cerebro-vascular barrier" is broken down. In other words, until the walls of the cerebral blood vessels are rendered permeable to specific immune substances there is no protective effect exerted by way of the blood stream upon the central nervous system. In the case of toxins which have selective effect upon this system there is little likelihood that the neutralizing action by antitoxic sera will be exerted there. There are various ways in which the cerebro-vascular barrier may be broken down, such as superheating, injection of diphtheria toxin or of tuberculine, etc. In the experiments under consideration the mechanical method of SPERANSKY was adopted, consisting of suboccipital puncture and withdrawal of an appreciable amount of cerebrospinal fluid with a syringe. The fluid is at once re-injected and the operation is repeated 2 to 4 times. By this intracranial compression and decompression the blood vessels are rendered permeable.

Two rabbits each received an intravenous injection of the same quantity of diphtheria toxin (10 to 15 lethal doses) and 45 to 60 minutes later, each the same quantity of antidiphtheria serum (1,000 to 1,850 units) intravenously. In one of these rabbits the cerebro-vascular barrier was then mechanically destroyed, with the result that whereas the control animal died at the end of 2 to 4 days, this one survived, or

died at a much later date. Similar protective results were obtained with antidysenteric serum. So also a dog, in which the cerebrovascular barrier had been destroyed, showed the presence of antitoxin, which had been intravenously injected, in its cerebrospinal fluid, while the control animal did not.

W. F. Harvey.

SUZAKI (Keizo). Versuche ueber den Einfluss von Dysenterie-Toxin auf ein ueberlebendes Darmstück des Kaninchens. [**Effect of Dysentery Toxin on a Living Portion of Intestine of the Rabbit.**]—*Oriental Jl. Dis. Infants.* 1927. July. Vol. 2. No. 2-3. German summary pp. 139-140. With 68 figs. [In Japanese.] [Children's Clinic, Kyoto Imperial Univ.]

The toxin for experimentation was a colourless filtrate of a suspension of bacilli through a Chamberland candle and the types of organism used were Shiga, Y, Flexner, Strong and Oga. Different portions of the intestine were subjected to test, duodenum, jejunum, ileum, large intestine and rectum, with the following results:—

1. The duodenum and jejunum were stimulated, the other portions inhibited.
2. The action of the toxin upon the circular and longitudinal musculature of the several portions of the intestine was found to be the same as that upon these portions as a whole.
3. The action is upon muscle and not upon nerve.
4. No essential difference of action between the different types of organism was found.
5. Heating of the toxin at 100° C. weakened but did not change its action.

The author considers that the toxic action of the dysentery bacillus is due to its content in toxic protein.

W. F. Harvey.

JUNGERBLUT (C. W.). **Observations on the Skin Reaction induced in Rabbits, Guinea Pigs and Goats by the Intracutaneous Injection of Dysentery Toxin.**—*Jl. Immunology.* 1927. June. Vol. 13. No. 6. pp. 427-432. [10 refs.] [New York State Dept. of Health.]

The toxins used in experiment were, one prepared from the bacillary bodies and the other a toxic filtrate. Rabbits and guineapigs gave practically no skin reaction to dysentery toxin. It is rather extraordinary that the skin of the rabbit should be so insensitive, considering the great systemic susceptibility of this animal. In 2 goats the toxic filtrate likewise produced no appreciable reaction on intracutaneous injection. Nine goats were injected with the endotoxin of which 4 gave a reaction with redness and swelling, 2 swelling with no redness, and 3 no reaction at all. In the four animals which reacted to unheated endotoxin, a similar reaction was obtained with endotoxin heated for 2 hours at 100° C., indicating a high degree of thermostability of this toxin. In a series of experiments in goats to determine if the intracutaneous skin reaction could be used to indicate neutralization of toxin by antitoxin, the reaction obtained with mixtures of toxin and low dilutions of antidysentery serum was definitely less marked than that given by toxin alone or mixtures of toxin with normal, antityphoid or antistreptococcus serum.

W. F. Harvey.

YOSHITOMI (T.). Ueber den typus der Dysenterie-Bacillen und Prognose der Kinder-Dysenterie in Dairen. [**Prognosis of Dysentery of Children in Dairen according to Type of Bacillus.**—*Oriental Jl. Dis. Infants*. 1927. July. Vol 2. No. 2-3. German summary p. 133. [In Japanese.] [Dairen Hosp., Dairen.]

In 1925, from dysentery cases in children the author isolated Y type in 26 cases, Flexner in 19 cases, and Shiga-original in 5 cases. The course of the illness was longest in the original type (Shiga) infections—33 days and these gave also the highest mortality.

H. M. H.

HIRANO (Rin) & SHIRAOGAWA (Hisashi). [**On the Dysentery Bacilli having Cholera Red Reaction.**—*Eiseigaku Densenbyogaku (Jl. of Hygiene & Infect. Dis.)* 1926. Nov. Vol. 22. No. 4. [Summarized in *Japan Med. World*. 1927. June 15. Vol. 7. No. 6. p. 181.]

A cholera red reaction was given by 56 out of 447 (12·5 per cent.) strains of dysentery, whereas no case with this reaction was met with out of 20 *B. coli* examined.

W. F. Harvey.

PANAYOTATOU (Angélique). Sur une espèce d'entérobacille isolé des selles à entérite. [**An Enterobacillus in Enteritis.**—*Cent. f. Bakt.* I. Abt. Orig. 1927. Nov. 22. Vol. 104. No. 7-8. pp. 473-477. [Greek Hosp., Alexandria.]

The bacillus was met with in diarrhoeic or dysenteric stools and was only obtained in pure culture on Sabouraud's medium. Besides the yellowish white colonies of bacillary forms, this organism gave transparent colonies of coccoid forms. Some of the features by which it was distinguished from the enterococcus were: (1) formation of a pellicle in bouillon and intense faecal odour; (2) fermentation of lactose, glucose and mannite with gas production and of saccharose without gas production; (3) no pathogenicity for the mouse; (4) very pathogenic to guineapigs and rabbits.

W. F. Harvey.

POGORSCHESKY (Herbert). Ruhrvaccine in der Prophylaxe der Säuglingsruhr. [**Prophylactic Dysentery Vaccine for Infantile Dysentery.**—*Ztschr. f. Kinderheilkunde*. 1927. Aug. 17. Vol. 44. No. 1-2. pp. 200-203. [4 refs.] ["Kaiser- u. Kaiserin-Friedrich" Hosp., Berlin.]

Altogether 172 infants of ages from 6 weeks to 10 months came under observation, of whom 80 received vaccine and 92 served as unvaccinated controls. These children were in hospital suffering from diseases other than dysentery and no selection was exercised in separating the two groups. The vaccine contained 3 parts Y and 1 part Shiga-Kruse bacilli and had a content of 500 million organisms to the cc. It was injected subcutaneously in quantities of 0·25, 0·5 and 0·75 cc., without any particular local reaction resulting. In 16 out of the 80 vaccinated infants there was a rise of temperature which varied

from 38° to 38·5° C. (100·4° to 101·3° F.) and in one case to 39° C. (102·2° F.). The results in the two classes were: 6 cases, of which one occurred on the day after the first injection among the vaccinated (7·5 per cent.) and 17 (18·3 per cent.) cases among the unvaccinated. These results, so far as they go, are in favour of vaccination as a prophylactic measure in infants. The children only remained 8–16 weeks under observation so that no idea could be formed of the duration of protection.

W. F. Harvey.

BIELOOUSOWA (A. J.). Le vaccin antidysentérique et son application. [**Antidysenteric Vaccine and its Application.**]—*Arch. Sci. Biol.* 1926. Vol. 26. No. 4–5. French summary pp. 387–388. [In Russian pp. 271–277.]

The author isolated from 12,480 cases of dysentery, Shiga-Kruse bacilli in 8,320, Hiss-Russell in 500, Flexner in 3,600 [60 negatives only]. A mixed vaccine was prepared containing 500 million bacilli of each type in 1 cc. Sensitized vaccines were made by treating the dysentery vaccines with the corresponding agglutinating serum 1 in 100. A vaccine was also prepared containing 1,500 million dysentery bacilli + 1,000 million cholera vibrios. Experiments with rabbits showed that after two doses of vaccine (well tolerated) agglutinins appeared in titre from 1:10–1:200. Sensitized vaccines gave the higher titre. Agglutinins were formed against each constituent of the mixed vaccine. Fifteen human beings were inoculated with the heated, and twenty with the sensitized vaccine. Febrile reaction was always insignificant, but the sensitized gave more local reaction than the heated vaccine. The sensitized vaccine is therefore the one of choice. The dysentery + cholera vaccine caused the formation of antibodies against both types of microbe.

H. M. H.

COMBIESCO (D.) & BRAUNER. Recherches sur le mécanisme de la vaccination par voie buccale contre la dysenterie chez le lapin. [**Mechanism of Oral Vaccination against Dysentery in the Rabbit.**]—*C.R. Soc. Biol.* 1927. Oct. 13. Vol. 97. No. 26. pp. 1004–1007. [2 refs.] [Exper. Med. Lab., Faculty of Med., Bucarest.]

A previous research (*Compt. Rend. Soc. Biol.*, lxxxviii, 1923, p. 904) had shown that the serum of orally immunized rabbits protected white mice against a lethal dose of Shiga dysentery toxin, although the serum itself agglutinated the dysentery bacillus only slightly or not at all. In the present investigation the authors find that extracts of spleen, liver and intestine of rabbits, which have been immunized orally against dysentery, have a high titre when their serum has little or no agglutinating power. The extracts which agglutinate most strongly are those like the spleen and appendix, which possess the most lymphoid tissue, and this fact is taken to indicate local production of antibody. At the same time the antigen if present in the intestine would appear to exert a sort of fixing action on the antibody in the blood, as evidenced by the diminution in one rabbit of the agglutinating power of the serum, after feeding, from 1 in 160 to 1 in 20.

W. F. Harvey.

MIXED AND UNCLASSIFIED DYSENTERY.

CHAO (H. A.). **Diagnosis of Dysenteries.**—*Nat. Med. Jl. China.* 1927. Aug. Vol. 13. No. 4. pp. 324-331. [13 refs.] [Hunan-Yale Med. Coll. Hosp., Changsha, China.]

A valuable critical review, of no little importance, for dysentery is extremely common in tropical countries. Proper treatment is feasible only on prompt differentiation of the types of dysentery. The usual methods of differential diagnosis, clinical and laboratory, are not reliable and practical.

Soon after onset of dysentery correct diagnosis can be accomplished by simple microscopical study of the cellular exudate of the dysenteric stool. A massive degenerated-leucocytic exudate with polymorphonuclears predominating, and with endothelial macrophages and ghost cells, are the basic elements in the bacillary dysenteric stool. Amoebic dysentery exudate has scanty cellular elements, and *E. histolytica* is present in vegetative form. A diagnosis of amoebic dysentery is never warranted by the presence of cysts alone. A superimposed infection of bacillary dysentery on top of amoebic should be ruled out to avoid danger of using emetine.

Faulty diagnosis is mainly due to ignorance of cytodiagnosis of the exudate and the mistaking of macrophages for *E. histolytica*. Bacillary, *not amoebic*, has been the predominating type of dysentery in the tropics.

[The immediate practical value and reliability of cytodiagnosis of the bowel exudate in dysentery, though first noted and reported by MANSON-BAHR (1910) and given comprehensive exposition by WILLMORE and SHEARMAN (1918) and ANDERSON (1921) and HAUGHWOUT (1923)—is a long time a coming into general recognition and use. Has it yet reached a school—even a school of tropical medicine—syllabus?]

H. M. H.

ALEXEIEFF (A.). Cytodiagnostic dans les affections du gros intestin (dysenteries bacillaire et amibienne, colitis ulcerosa). [**Cytodiagnosis in Affections of the Large Intestine.**].—*Cent. f. Bakt.* I. Abt. Orig. 1927. Sept. 10. Vol. 103. No. 6-8. pp. 354-363. With 42 figs. on 2 plates. [4 refs.]

Careful illustrations in support of the author's cytological contentions add much to the value of this interesting paper. "Pyograms" are specific; that is to say, the reaction of an organism to a given microbic invasion is determined above all by the nature of the microbe, which makes a definite mark of some sort in the focus of inflammation. Thus, there is a striking resemblance between "gonogram" (gonococcal pus) and "meningogram" (meningococcal pus). In both were found neutrophils with nucleus in a state of "caryophysema"—nucleus so hypertrophied as to reach the stage of "free nucleus." "Caryophysema" is a characteristic result of the toxin of these two microbes only.

The amoebogram (pyogram of amoebic dysentery) is very definite; but the ulcerations caused by the dysentery bacillus, as well as those of "colitis ulcerosa," give a "neutral" pus without indications of the nature of the pathogenic agent.

Cytodiagnosis.—*Macroscopically* the amoebic dysentery stool shows a typical raspberry-jelly like appearance. The blood is intimately mixed with other constituents of the stool. In the mass are scanty clots of mucus transparent as glass. In the bacillary dysentery stool the blood is in streaks, and even when there is much of it, it is not intimately mixed with the other stool constituents, and the numerous clots are quite opaque. By the microscope the opaque clots are seen to be made up of an enormous number of neutrophiles; while the transparent clots of amoebic dysentery are "mucilaginous," and contain only a very few cells. The pyograms of the two dysenteries are very different. In bacillary dysentery there are 97–98 per cent. neutrophiles, 1–2 per cent. eosinophiles, and some "plasmophages." In amoebic dysentery 20–30 per cent. neutrophiles, 1–2 per cent. eosinophiles (sometimes a local massive eosinophilia), some plasmophages and 70–80 per cent. small lymphocytes. (Naturally where there is massive local eosinophilia, the above leucocyte formula is altered.) Moreover, and very rarely, some neutrophiles have a nucleus in 6–7–8 segments, of unequal division and disposed fan-like, or like the petals of a daisy. This sort of neutrophile is absent from bacillary dysentery pus. Explanation of these macro- and micro-scopical differences must be sought in the pathological anatomy of the lesions.

In bacillary dysentery (excluding the gangrenous type), there is in the large intestine a superficial necrosis, slight, diffuse, but provoking an acute inflammatory reaction; hence the opaque neutrophile-crammed clots. In amoebic dysentery there is localized ulceration, deep, with undermined edges, forming an almost closed pocket, in which the blood (abundant for the deep lesion has eroded vessels of a relatively large calibre) has time to get intimately mixed with the ulcer-pus during peristalsis of the gut (spastic contractions of the intestine characterize both dysenteries). The solitary follicles are invaded by the amoebae; hence the 60–70 per cent., or more, lymphocytes in the bowel-exudate. But in bacillary dysentery the solitary follicles are equally invaded—and there is no lymphocytosis in the pus. This is probably because necrosis caused by the bacillary toxin progresses so quickly as to suppress the preliminary stage of proliferation from functional stimulus. For "small lymphocyte," it is perhaps preferable to substitute the term "pycnotic cell" (J. ANDERSON). If some of them show a large nucleus surrounded by a thin rim of cytoplasm, others show fusion of two or three nuclear masses. The author suggests they are neutrophiles in which fusion of nuclear segments has taken place. If this be so, this degeneration constitutes a sound differential character, for it is not seen in bacillary dysentery nor in colitis ulcerosa.

The author uses "plasmophage" as synonymous with "macrophage." In sections of mesenteric lymphatic glands from patients who had succumbed to bacillary dysentery or to colitis ulcerosa, many of these monophages can be seen, especially at periphery of the gland.

COLITIS ULCEROSA—The author discusses its etiology. It is very common in Turkestan. It has been held to be simply chronic bacillary dysentery. *Macroscopically* the stools are identical with those of bacillary dysentery (especially of the "white" type, i.e., with little blood). *Microscopically*—the pyogram is completely identical with that of bacillary dysentery. Observations on many cases of colitis ulcerosa in Tashkent has led the author to conclude that this pathologic process is amicrobic.

Macrophages.—In all the three dysenteries of this paper, the pus contains plasmophages; these are the “macrophages” developing from the plasmocytes of Unna. These plasmophages are often mistaken for *Entamoeba dysenteriae* and many eminent protistologists have included these plasmophages in descriptions of the cycle of development of *E. dysenteriae*. The light chromatin masses in the periphery of the nucleus of supposed *E. dysenteriae* are really peripheral pyknosis in the nucleus of a plasmocyte!

The author's investigations reveal that ulceration of the intestinal mucous membrane leads always to formation of plasmophages. The presence of these plasmophages therefore can never constitute a diagnostic criterion. However, if they are numerous, it is a sign of favourable reaction, and resistance of the organism to the pathological process.

Mode of action of emetine.—Spasm of intestine occurs in amoebic (and in bacillary) dysentery. Emetine has a powerful paralysing action especially on the unstriated muscle of the gut; it would therefore counteract this spasm. The author has observed changes in the morphology of *E. histolytica* in the stools of cases of dysentery treated by subcutaneous injection of emetine. The amoebae become rounded with great retraction of endoplasm and almost complete immobility of ectoplasm—signs of direct poisoning action of the emetine.

DOBELL & LAIDLAW (1926), and VOGEL (1927) are cited further in support of the view that emetine acts as a direct parasiticide, and not only as augmentor of the organism's natural means of defence.

Local eosinophilia in the intestine.—The author has often observed marked eosinophilia in the stools of cases of muco-membranous colitis. In amoebic dysentery he has noted often in the pus of stools collections of eosinophiles—accompanied usually by Charcot-Leyden crystals. In these cases the blood showed no eosinophilia. Frequently in the stools of these cases eosinophiles with a single nucleus (myelocytes) were found, though none could be found in the blood. This implies that the eosinophiles are found in the actual intestinal wall.

H. M. H.

HANCE (J. B.). **The Sigmoidoscope as an Aid to Diagnosis in Chronic Dysentery and its Sequelae.**—*Indian Med. Gaz.* 1927. Sept. Vol. 62. No. 9. pp. 496–499. [8 refs.]

The author quotes ACTON & KNOWLES (1924)—“The M.O. in charge of a mofussil dispensary may often have to diagnose ‘dysentery’ and to prescribe the stock ‘dysentery mixture’ of aperient sulphates. At least we have the knowledge that he is not thereby doing any harm; but we look forward to the day when a few relatively simple microscopical tests will enable him to give at least a more or less correct guess and to apply the correct treatment.” [ACTON & KNOWLES have taken part in showing that bacillary is by far the commoner type of dysentery in India. Has not Dr. Mofussil therefore guessed most times correctly about the nature of his patient's dysentery and correctly prescribed the aperient sulphates, without hazarding a less or more incorrect view as to its nature through the microscope? In fact the differential diagnosis of dysentery by microscopical examination of stools is never simple at all, but requires no small training and skill.]

Major Hance urges that any factor which helps to establish diagnosis, especially if it be applicable where skilled laboratory assistance is not

available, is an aid to the practitioner and a benefit to the sufferer. Such a factor is the direct inspection of the mucosa of rectum and lower reaches of pelvic colon by the sigmoidoscope.

This instrument has long been used by proctologists, but its routine employment in diagnosis of chronic diarrhoea was first urged by HURST (1921). Later MANSON-BAHR and GREGG (1921) have advocated its use in amoebic dysentery; and RYLE (1924) has stressed its use in diagnosis and treatment of chronic diarrhoeas of colonic origin.

The author gives his own experience. The sigmoidoscope reveals—in *chronic amoebic dysentery*—pin-head ulcers, circular, saucer-shaped and distinct, with shallow craters, and bases clean or with yellow slough. The intervening mucous membrane is normal. Sometimes the ulcers crown small elevations, resembling minute boils or carbuncles. In more acute cases ulceration is more extensive and flame-shaped, and blood-stained mucus may obscure the view.

After successful emetine treatment, in mild cases the mucous membrane appears absolutely normal, in severer cases recent scarring is shown.

In chronic bacillary dysentery—generally injected mucous membrane, strawberry-red, bleeding easily, or irregular ulcers, shallow, margins not undermined, bases with shreds of muco-pus, of which a film may cover whole ulcer: or exuberant granulation tissue masking adjacent ulceration. The intervening mucous membrane is swollen, turgid, strawberry-red and bleeds easily.

In favourable cases effect of treatment is theatrical, re-examination a few days after serum treatment revealing a mucous membrane which may be completely normal in appearance.

Diagnosis may be confidently made and treatment commenced on sigmoidoscopic appearances alone—*notwithstanding a negative or non-committal report from the laboratory*. Cases with positive laboratory report after appropriate treatment are not discharged until sigmoidoscope confirms laboratory negative report. RYLE (1926) has recorded cases similar to the author's where this instrument has established diagnosis and determined cure when laboratory reports had been persistently negative.

H. M. H.

FADERIN (K.). **Gaol Dysentery.**—*West African Med. Jl.* Lagos. 1927. Oct. Vol. 1. No. 2. pp. 24 & 28.

An outbreak of dysentery in a Nigerian prison lasting from mid-June to nearly the end of August, 1927. Sanitation, water supply, ventilation, space—on critical examination none of these could be adjudged as a contributory or causative factor. Owing to failure of yam supplies, the white imported rice was substituted for a body of prisoners whose accustomed diet was yam. The immediate effect of the rice diet was looseness of bowels followed by dysentery, which spread to prisoners whose diet had not been changed. Sixty-seven cases of dysentery were admitted to the Prison Infirmary and seven deaths occurred. Examination of faeces in two cases revealed *Shiga bacillus*; judging from cases treated in the African Hospital, amoebic was the type of dysentery most common in the town.

H. M. H.

SKELTON (D. S.), MALCOLM (J. W.) & LLOYD (R.). "**Dysentery**" in **Northern Iraq**.—*Jl. Roy. Army Med. Corps.* 1927. Aug. Vol. 49. No. 2. pp. 127-129. [3 refs.]

The authors declare that though it is of vital importance to arrive at a correct diagnosis of any dysentery, yet it is by no means always easy to do so. Their own work in Mosul confirms this. The so-called "Mosul-tummy" is one of the commonest of ailments among British troops in Mosul.

October 1925 to December 1926. 187 Cases Investigated.					
Bacillary dysentery	...	...	...	...	29 cases.
Vegetative amoebae	...	...	...	...	1 "
<i>E. histolytica</i> cysts	...	...	...	...	32 "
Ova of intestinal parasites	...	...	...	...	16 "
<i>B. typhosus</i> isolated	...	...	...	...	1 "
Tubercle bacillus	...	...	...	...	1 "
Negative results	...	...	...	...	107 "
Of the 29 Bacillary Cases.					
Gaertner group	.....	...	...	...	14 cases.
Flexner	...	...	...	...	8 "
Morgan	...	...	...	...	1 "
Shiga	...	...	...	...	1 "
Unclassified	...	...	...	...	5 "

The 107 "negative results" cases is disappointing, but in accordance with the experience of other laboratory workers. Some of the cases were far from the hospital and there was not always due recognition of the necessity of sending specimens to the laboratory without delay. It is not surprising that all laboratory results in Iraq are not in agreement. Iraq is a big country with widely varying climatic and other conditions. The only common factors are dirt and dust and flies. The authors conclude that "bacillary" is the commonest form of dysentery and the commonest bacillus a Gaertner one. This predicates dirt in the kitchen and dirt on the hands of the cook and his mates. Even with efficient fly-proofing, until the mess sergeant forcibly washes the hands of the cook with some strong antiseptic several times a day, so long will there be diarrhoea and mild dysentery.

H. M. H.

HILL (Claire McDowell) & HILL (Rolla B.). **Infection with Protozoa and the Incidence of Diarrhoea and Dysentery in Porto Rican Children of the Pre-School Age**.—*Amer. Jl. Hyg.* 1927. Mar. Vol. 7. No. 2. pp. 134-146. [6 refs.]

(1) Smear and culture examinations of 300 faecal specimens from 125 Porto Rican children showed the following percentages of children infected.

<i>Entamoeba coli</i> , 19.2 per cent.	<i>Giardia lamblia</i> , 47.2 per cent.
<i>E. histolytica</i> , 2.4 per cent.	<i>Chilomastix mesnili</i> , 24 per cent.
<i>Endolimax nana</i> , 10.4 per cent.	<i>Trichomonas hominis</i> , 20.9 per cent.
<i>Iodamoeba bütschii</i> , 4.8 per cent.	

(2) Compared with that found in Porto Rican adults the children's stools were lightly infected with amoebic cysts and heavily with flagellates.

(3) Of the 125 children, 52.8 per cent. had suffered from recurrent or chronic diarrhoea for months or years, 25.6 from severe diarrhoea (not chronic or recurrent), 5.6 from one or more dysentery attacks and 16.8 had never had either dysentery or diarrhoea.

(4) Only 3 of the 125 were found to be carriers of *E. histolytica*. This parasite does not appear to be an important cause of diarrhoea or dysentery in Porto Rican children.

(5) Diarrhoea was much more common in those children who had flagellate infections than in those who had none. This relation was distinct, though it is not certain that the flagellates caused the diarrhoea.

H. M. H.

BRUCHMANN (Carlos A.) & STÁBILE DE NUCCI (Luis). Enterocolitis disenteriformes graves de la infancia observadas en la ciudad de Santiago del Estero. [**Severe Dysenteriform Enterocolitis in Childhood.**]—*Bol. Inst. Clin. Quirúrg.* Buenos Aires. 1927. Vol. 3. Nos. 21-25. pp. 232-241. [1 ref.] [Also issued as *3a Reunión Soc. Argentina Patol. Regional del Norte, Tucumán, Julio, 7, 8 y 10, 1927.* pp. 124-133.]

The symptoms of a grave intestinal disease of children in Santiago del Estero are related. These are: severe and in some cases uncontrollable diarrhoea, the stools being fluid, yellow, greenish or grey and mucoid, blood-tinged and even occasionally frankly haemorrhagic and accompanied by grave toxic symptoms and constitutional disturbance. No single cause is found; in some Shiga's bacillus is isolated, in others a special Streptococcus or a coliform organism; in short, nothing definite is known as to the aetiology. Six cases are mentioned, varying in age from 13 to 30 months. Four of these ended fatally, the stools in one of them numbering 70 in the 24 hours. Treatment is purely symptomatic, and is clearly not very successful.

H. Harold Scott.

RAYMOND-HAMET. Sur une drogue antidysentérique encore inconnue en France. [**An Antidysenteric Drug unknown in France.**]—*Bull. Acad. Méd.* 1927. July 19. Year 91. 3rd Ser. Vol. 98. No. 29. pp. 109-114. With 2 text figs. [23 refs.] [Pharm. Lab. Faculty of Med., Paris.]

Uzara, the root of an Asclepiad of the genus *Gomphocarpus* used by certain African tribes in diarrhoea and dysentery, was introduced into Europe in 1910 by HOFF. In 1917 HENNIG isolated its active principle—*uzarine*.

Panzaron, an alcoholic extract of uzara, contains more than 10 per cent. of uzarine. Panzaron has been used in various bowel complaints and its effects studied by different workers whose reports, though somewhat conflicting, are generally favourable to its use in dysentery. The author has shown (1926) that uzarine and panzaron do not act like adrenalin, for their vasoconstrictor and hypertensive action was not reversed by yohimbine nor by ergotamine. Later, with Jeanne LEVY, he showed that panzaron and uzarine arrest contractions in the isolated intestine, but increase intestinal tonus, while adrenalin diminishes it. In this paper the author describes his experiments, demonstrating that panzaron and uzarine arrest completely contractions of the intestine *in situ*, which is immobilized in a state of relaxation in contrast to the contracted state brought about by these drugs in the isolated gut. It is probable that panzaron acts on the local nervous system of the gut. The guinea-pig tolerates intraperitoneal injections of 250 mgm. of panzaron per kilogram of animal.

H. M. H.

LUCHINI (Federico P.) & PEREZ DE NUCCI (Roberto). Sobre un caso de perisigmoiditis con lamblías intestinales y su tratamiento por el yatren 105. [**A Case of Lambliasis treated with Yatren 105.**]—*Bol. Inst. Clin. Quirúrg.* Buenos Aires. 1927. Vol. 3. Nos. 21-25. pp. 242-244. [Also issued as *3a Reunión, Soc. Argentina Patol. Regional del Norte, Tucumán*, 7, 8 y 10, 1927. pp. 134-136.]

A woman, 29 years of age, with a history of abdominal pain, more acute in the left iliac fossa, attacks of vomiting, copious diarrhoea, 20-30 stools a day, at intervals during 3 years. Nutrition was, nevertheless, well maintained. Examination of the stools revealed only *Giardia*. Treatment with Yatren, 4 pills, each of 25 cgm., thrice daily for ten days, followed by enemata, 200 cc. of a 3 per cent. solution, daily during the succeeding ten days, brought about a cure.

H. Harold Scott.

BRUG (S. L.). Note sur deux cas d'infection balantidienne traités à la santonine. [**Two Cases of Balantidial Infection treated with Santonin.**]—*Bull. Soc. Path. Exot.* 1927. Oct. 12. Vol. 20. No. 8. pp. 741-743. [5 refs.] [Med. Lab., Weltevreden, Java.]

The author notes that of many drugs used in treating balantidiasis, stovarsol appears to have been the most successful; he now calls attention to two cases successfully treated with santonin.

Case I (1926) slight diarrhoea. Stool examination revealed *Balantidium coli*, and very numerous ascaris ova. The patient was given oil of chenopodium. This failed to expel all the ascaris and, though balantidium disappeared for 7 days, they were found again after a saline purge. The patient was then given during four days, 25 mgm. of santonin and 50 mgm. of calomel twice daily. In the following month stool examinations on 25 occasions revealed no balantidium even after saline purge.

Case II. The author quotes the case described by ONGKIEHONG (1927): a boy 8 years old suffered from dysentery; the bloody mucous stools containing *Balantidium coli*. During three days he was given 15 mgm. santonin and 30 mgm. of calomel thrice daily. Dysentery symptoms rapidly disappeared and for 19 days after the treatment a daily examination of the stool revealed no balantidium even after saline purge.

The author states that although two recorded successes is insufficient for a judgment on the real efficacy of santonin in balantidiasis, yet it warrants a further trial on a larger number of cases [?without calomel].

H. M. H.

FOX (Frank W.). **Balantidium' Dysentery in an Infant.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1927. Aug. 31. Vol. 21. No. 2. p. 153. [Baptist Mission Soc. Hosp., Sao Salvador do Congo, Angola.]

An infant 40 days old was found to be suffering from painful defaecation and diarrhoea of six hours' duration. The faeces contained blood and mucus, and by microscope revealed *Balantidium coli*. Magnesium sulphate, 1 drachm, was given on 3 consecutive days. No other treatment. Twenty-four hours after first dose blood and mucus disappeared and subsequent repeated microscopical examinations revealed no balantidia.

H. M. H.

SANMARTINO (Rodolfo). La disentería causada por el *Balantidium coli*. [**Balantidial Dysentery.**]—*Bol. Inst. Clin. Quirúrg.* Buenos Aires, 1927. Vol. 3. Nos. 21–25. pp. 195–222. With 23 figs. [38 refs.] [Also issued as *3a Reunión, Soc. Argentina Patol. Regional del Norte, Tucumán, Julio, 7, 8 y 10, 1927.* pp. 87–114.]

This paper gives a very clear account of balantidial infection, not only in man but in other primates and in the pig. It is of the nature of a summary or, rather, a detailed précis of our knowledge at the present day, but brings forward no new facts.

The larger and best part of the article is that describing the morbid anatomy, which is illustrated by good microphotographs.

H. Harold Scott.

BONNEL (F.). Sur un cas de balantidiase. [**A Case of Balantidiasis.**]—*Rev. Path. Comp. et Hyg. Gén.* 1927. June 20. Vol. 27. No. 327. pp. 692–696. [11 refs.]

The subject of this case was a young Algerian sepoy sent finally to Bordeaux after suffering from diarrhoea for about six months in the course of which he had become much emaciated. The stools contained *Balantidium coli*, but neither blood nor mucus. Neither thymol nor stovarsol have done lasting good, and the author therefore proposes to try treparsol.

A. Alcock.

- HAREFUH. 1927. July. Vol. 2. No. 3. pp. 413–418. With 2 charts.—A Review of Dysentery in Palestine. [KLIIGLER (I.) & WEIZMANN (I.).]
— pp. 418–424.—The War Against Amoebic Dysentery. [WINSHAL (Z.).]
— pp. 424–433.—The Clinical Picture of Amoebic Dysentery. [LEVONTIN.]
— pp. 433–438.—Treatment of Dysentery with Stovarsol. [STEIN (Joseph).]
— pp. 438–441.—Specific and Non-Specific Therapy of Amoeb. Dysentery. [BICHOWSKY (A.).]
— pp. 441–445.—Emetin, Yatren and Stovarsol in Amoebic Dysentery. [DEUTSCH. D. D.).]
MACIEL (Heraldo). Conceito actual da etiologia e do tratamento das dysenterias. *Sciencia Med.* 1927. May & Oct. Vol. 5. Nos. 5 & 10. pp. 235–250; 589–599.

REVIEWS AND NOTICES.

NOHL (Johannes) [Compiled by]. Translated by C. H. CLARKE [Ph.D.] **The Black Death. A Chronicle of the Plague.**—284 pp. With 12 plates & 28 text figs. First published in Great Britain in 1926. London: George Allen & Unwin, Ltd., Ruskin House, 40, Museum Street, W.C.1. [12s.]

This book is a compilation from various sources, German mainly; but including many works in other languages—Daniel DEFOE's history of the "Great Plague" in London, 1664 and 1665, is frequently quoted. The Bibliography at the end of the book fills several pages. The chief purpose of the work is to demonstrate the devastating inroads made in former times by epidemics into the spiritual and social life of the various nations. The purely medical aspect is not very much in evidence. The name "Black Death," commonly given to the plague of 1348, was the expression of the dread and horror aroused by the disease. Gloom went before and popular imagination depicted the plague as a man mounted on a black horse, or else as a black giant striding along, his head reaching above the roofs of the houses. People even feared to speak to any infected person. We are told that in 1347 Genoese sailors, infected with plague, entered the harbour of Messina: "In their bones they bore so virulent a disease that anyone who only spoke to them was seized by a mortal illness and in no manner could evade death."

Plague may or may not have originated in China as here stated; but the disease was known and feared all over the East long before the beginning of the Christian era. It dates from the earliest times when men gathered together in towns in the East and rats became a source of infection under unnatural and filthy surroundings. The disease obtained such evil eminence that it became known as *the pest* without qualification. It is believed that plague was little if at all known in Western Europe and England previous to the Crusades. Later, when extensive trade with India began in the sixteenth and seventeenth centuries *Mus decumanus* was a further source of infection. It is not possible to quote fully from all the various accounts of epidemics in Europe from the fourteenth to the eighteenth century; but one or two will be selected as general types of the records upon which this book is founded. A translation of BOCCACCIO's description of plague in Florence records that plague "by the just anger of God was sent upon us mortals," in 1348. It began "under the armpits, or in the groin by certain swellings, in some to the bignesse of an Apple, in others like an Egge, . . . which they termed to be a Botch or Byle." Of the virulence of the infection he says that the disease was at once contracted not only by speaking to the sick, but by touching their garments or food and not only by man, but by "any beast . . . were it Dogge, Cat, or any other." He records that he saw two swine tumbling infected clothes in the street "and immediately, each turning twice or thrice about, they both fell down dead." On the outbreak of an epidemic the rich fled from the towns and panic seized those that remained. Terror caused the patients to be forsaken even by their nearest relations. In a report on plague in Austria, 1679, we find the following: "Then there was no love, no faithfulness, no trust. No neighbour would lend a helping hand to another." The medical profession was helpless as regards any means of prevention or cure. There were many brave doctors and priests who visited the sick, but there are also records of cowardice in both professions. All business stopped and many died of famine. The plague epidemics found graphic expression in pictures of the "dance of Death." Such a picture was possessed by practically every large town as shown by several illustrations in this book.

Since nothing was known concerning the causation of plague until the nineteenth century it was generally thought to be sent as punishment for sin. The Churches, Catholic and Protestant, supported this view, and, if ignorance is sin, they were right. Even in the fourteenth century there were attempts to check the spread of the disease. Plague-infected cities,

such as Florence and Bristol, were cut off from neighbouring areas in 1348. In 1374, at Reggio, Visconte Bernabo ordered that: "Everyone sick of the plague is to be brought out of the town to the fields, there to die or recover." Plague regulations issued in Rouen in 1507 contain nothing of sanitary value, but announced "that everything is to be eliminated that could cause the anger of God, such as gambling, cursing drinking, and all excesses." Orders were frequently given to destroy dogs and cats, but rats did not receive the same attention. The mortality throughout the centuries dealt with was appalling. The compiler gives a list of "celebrated men" who died of plague between 1138 and 1639 and states that the proportion of victims of plague in the fourteenth century in Europe is estimated to be too low if placed at 25 per cent. of the population. In 1467 Moscow mourned the loss of 127,000 victims, Novgorod and district of 230,602. In Rome 70,000 died in 1591. Thurgau lost more than half its population in 1611; the Republic of Venice 500,000 in 1630 and 1631 and London 160,000 in 1665 and so on. From a letter written from Naples, July 10th, 1656, by John Baptista Spinell, we learn that 60,000 corpses were burned and a further 170,000 buried in huge trenches. Owing to the terror created by the plague, the dead often lay in heaps in the streets and it was very difficult to get anyone to bury them. In some towns prisoners, driven by soldiers, were forced to act as gravediggers. These epidemics produced not only bodily death, but panic and extreme mental and moral deterioration. Men, women and children, in imitation of their elders, lost all control, all self-respect.

The rest of the book is filled up with chapters on various superstitions, the attitude of the Church, the diabolic element in plague, persecution of the Jews, the history of the Flagellants and Choreomania, which included dancing naked in the streets with added immorality. These chapters are not pleasant reading, except perhaps for the curious in Freudian psychology. Even the art of those times was affected and many of the illustrations are either grotesque or disgusting.

J. H. Tull Walsh.

WILSON (F. P.) **The Plague in Shakespeare's London.**—pp. xi + 228. With 27 illustrations. 1927. Oxford: At the Clarendon Press. [12s. 6d.]

The mention of plague in England recalls to the minds of most of us a passably clear recollection of the London Plague of 1665, thanks to Pepys and Defoe, together with a faint notion of an earlier Black Death at some rather uncertain epoch in the Middle Ages, all the long series of annectent epidemics being totally forgotten, perhaps never heard of. This book, which deals with the plague years of 1603 and 1625 and the intervening quiescent period, began originally as a commentary on Dekker's plague pamphlets, but with the growth of the author's materials the commentary has expanded into a volume of respectable dimensions wherein is traced the history of the Plague Orders and the Bills of Mortality from their inception, embellished with a wealth of detail and apt literary allusion which tells of many a weary hour of painstaking research. In his chapters describing the plague years the author paints a vivid picture of those awful times, when the cheerful sounds of a great city were replaced by the howling of starving dogs, the raving of the sick, and the mourning of the bereaved. Grass grew in the streets of London; commerce was at an end; in Cheap-side a piece of gold could hardly be changed; spices for "comfortable Broth" were unobtainable, for the dealers had fled; and the only trades that flourished were those dependent on pestilence and death. Some of the entries quoted from the burial registers are truly pathetic—"A poor boy that died under St. John's wall," "a poor wench died in the Cage," "a poor child found at Mistress Bake's door." John, the son of Richard Sperwigg, was buried in Kensington on October 1st, his sister Mary, on the 26th, his

brother Richard four days later, his mother Alice on November 2nd, his brother Thomas on the 7th, and lastly Richard Sperwigg himself on the 23rd.

The author, as a layman, does not attempt to interpret in the light of modern epidemiological knowledge the pertinent observations of the age, sometimes very shrewd, but confines himself to the literary and historical aspects of his subject, except for an occasional venture into the medical domain—not always happy in the result, as when he states that the absence of external lesions in plague is indicative of the pneumonic variety of the disease.

A volume crammed with historical lore and fully documented might be permitted some measure of dullness; but here the materials have been handled so skilfully and enlivened by so delightful an infusion of English scholarship that the reader who once opens the book will find difficulty in closing it again. The author is to be congratulated on a very notable performance.

W. P. MacArthur.

Arbeiten ueber Tropenkrankheiten und deren Grenzgebiete. [**Works on Tropical Diseases.**] Bernhard NOCHT zu seinem 70. Geburtstag von Freunden und Schülern gewidmet.—*Abhandl. a. d. Gebiet d. Auslandsk.* (Herausg. v. Hamburg. Univ.) Vol. 26. (Ser. D. Vol. 2.). pp. x+643. With text figs. & 41 plates. 1927. Hamburg: Kommissionsverlag L. Friederichsen & Co.

The presentation to a professor on his birthday of a volume of original work by his pupils and friends is a pleasant custom and a graceful compliment: indeed it is more than that, for it is prompted by esteem and affection for the man, as well as by respect for the eminence of the teacher.

In this publication of the University of Hamburg, more than a hundred contributors, of many nationalities and including some of the best known authorities on tropical diseases, have joined forces to do honour to Professor Bernhard NOCHT on the occasion of his seventieth birthday.

Most of the articles are necessarily short, but the field surveyed is a wide one and cosmopolitan in range. Malaria naturally claims a large proportion of the book; medical zoology and therapeutics are also well represented. Among so much good matter, it is difficult to choose any particular essay for special praise. The short article by Professor MOIDOVAN, on the Nature of Anaphylaxis, and that by Professor SCHUEFFNER and others, on the Aetiology of Yellow Fever and the significance of *Leptospira icteroides* Noguchi, are models of compression, such as is possible only to those how are real masters of their subjects. The contribution by Professor SEYFARTH, on Hodgkin's disease, is of much value to all who are interested in the diseases of the Tropics. But these are selections made almost at random, and there are many other articles of equal merit to those mentioned.

It must surely be a source of legitimate pride and great satisfaction to Professor NOCHT that he has been the inspiration of so much good work by his friends.

The book is well illustrated and well printed on good paper; the price is not stated.

H. J. Walton.

BUREAU OF HYGIENE AND TROPICAL DISEASES.

TROPICAL DISEASES
BULLETIN.

Vol. 25.]

1928.

[No. 4

MEDICAL ZOOLOGY.

STILES (C. W.). **Amendments to the International Rules of Zoological Nomenclature. Important Notice to Zoologists, Physicians, Veterinarians, and others using Zoological Names.**—*Public Health Rep.* 1927. Oct. 28. Vol. 42. No. 43. pp. 2639-2640.

"ARTICLE 25. The valid name of a genus or species can be only that name under which it was first designated on the condition :—

"(a) That (*prior to January 1, 1931*) this name was published and accompanied by an indication, or a definition, or a description ; and

"(b) That the author has applied the principles of binary nomenclature.

"(c) *But no generic name nor specific name published after December 31, 1930, shall have any status of availability (hence, also, of validity) under the rules, unless and until it is published either—*

"(1) *With a summary of characters (seu diagnosis ; seu definition ; seu condensed description) which differentiate or distinguish the genus or the species from other genera or species ;*

"(2) *Or with a definite bibliographic reference to such summary of characters (seu diagnosis ; seu definition ; seu condensed description). And further :—*

"(3) *In the case of a generic name, with the definite unambiguous designation of the type species (seu genotype ; seu autogenotype ; seu (ri)hotype).*

"The purpose of this amendment is to inhibit two of the most important factors which heretofore have produced confusion in scientific names. The date, January 1, 1931, was selected (instead of making the amendment immediately effective) in order to give authors ample opportunity to accommodate themselves to the new rule.

"The Commission unanimously adopted the following resolution :

"(a) It is requested that an author who publishes a name as new shall definitely state that it is new, that this be stated in only one (i.e., in the first) publication, and that the date of publication be not added to the name in its first publication.

"(b) It is requested that an author who quotes a generic name, or a specific name, or a subspecific name shall add at least once the author and year of publication of the quoted name or a full bibliographic reference.

"The foregoing resolution was adopted in order to inhibit the confusion which has frequently resulted from the fact that authors have occasionally published a given name as 'new' in two to five or more different articles of different dates—up to five years in exceptional cases."

A. Alcock.

BLACKLOCK (D. B.) & GORDON (R. M.). **The Experimental Production of Immunity against Metazoan Parasites and an Investigation of its Nature.**—*Ann. Trop. Med. & Parasit.* 1927. July 22. Vol. 21. No. 2. pp. 181–224. With 2 graphs & 2 figs. on 1 plate. [31 refs.] [Sir A. L. Jones Research Lab., Freetown, Sierra Leone.]

The authors' preliminary account of their experimental immunization of guineapigs to the parasitic larva of the tumbu fly, *Cordylobia anthropophaga*, have been noticed in this *Bulletin* (Vol. 24, p. 861). The present paper contains the full details of their investigation, namely, the experimental proof of a true immunity "acquired as a result of previous infection or vaccination, and involving the death of the metazoan parasite in the host within a specified time"; and the experimental determination of the nature of this immunity. The following are their conclusions:—

"(a) It is a skin immunity confined at first to areas of skin into which the parasite has previously penetrated or which have been vaccinated with larvae or emulsions of larvae.

"(b) The general circulation and the deeper tissues, while necessary for the immunity, take no direct part in the destruction of larvae which have penetrated immune areas, since 79 per cent. of such larvae are dead within forty hours, i.e. before they have penetrated the deeper tissues.

"(c) The immunity, which is at first localized, tends to spread from the primary focus, so that areas which have never been the site of invasion by the parasite may ultimately become immune.

"(d) It has been shown that the immunity lasts for at least three months; it probably persists much longer.

"(e) The immunity is reproduced in new skin which grows on an abraded immune area; it persisted (one experiment only) in skin transplanted from an immune to a non-immune animal; it does not, however, persist in portions of immune skin which are removed from the animal and kept *in vitro*.

"(f) The occurrence of eosinophilia in certain forms of metazoan infection is well known; in this study we have made experiments which showed that:—

"i. A high degree of immunity may exist with or without eosinophilia.

"ii. A high degree of eosinophilia may exist with or without immunity.

"iii. Certain experiments which were performed suggested that applications of emulsions of the parasite to an animal may produce entirely opposite effects on the eosinophile percentage according to the method adopted, e.g., intraperitoneal injection markedly lowers it, subcutaneous injection or application of larval emulsions as a dressing to the abraded skin equally markedly raise it, while similar dressings applied to the unbroken skin either do not alter it at all or else they reduce it.

"No evidence of toxic effects or anaphylaxis, similar to those described as resulting from injection of *Ascaris*, *Oestrus* and *Hypoderma* have been observed by us. Nor has the application of larvae in hundreds during the experiments ever produced signs of anaphylaxis. No visible reaction has resulted from the application of emulsions of any stage of the larva to the conjunctiva or the skin of either immune or non-immune animals.

"The metazoan immunity described is governed by laws which differ widely from those governing bacterial immunity."

A. A.

WRIGHT (W. Rees). **A Note on Mounting Media for Parasitological Materials.**—*Ann. Trop. Med. & Parasit.* 1927. July 22. Vol. 21. No. 2. pp. 179–180. [2 refs.] [Univ. Coll. of N. Wales, Bangor.]

The medium here recommended, for mounting objects such as nematodes for the microscope, is made by mixing equal weights of flowers of camphor and pure phenol and adding to the oily product about twice its volume of a thin solution of gum sandarac in iso-butylic alcohol. This medium can also be used for mounting sections stained with carmine or haematoxylin, but is not recommended for Romanowsky stains. The advantage claimed for camphor-sandarac media is that objects can be mounted straight from 70 per cent. spirit.

A. A.

FRANCIS (Edward). **Microscopic Changes of Tularaemia in the Tick *Dermacentor andersoni* and the Bedbug *Cimex lectularius*.**—*Public Health Rep.* 1927. Nov. 11. Vol. 42. No. 45. pp. 2763–2772. With 9 figs. (7 on 4 plates). [5 refs.]

Ticks take an important part in the transmission of tularaemia from rabbit to rabbit, and to man; bedbugs have transmitted the infection (experimentally only) to mouse and guineapig. In adult ticks infected experimentally (by feeding on infected guineapigs) the bacillus was found in the coelomic blood, and in packed masses distending the epithelial cells of the rectum and gut and Malpighian tubules; occasionally a pack of bacilli were seen free in the lumen of the gut, as if an infected cell had burst; the organisms were not detected with certainty in the salivary and reproductive glands or in any other tissue or organ. In bedbugs fed on infected mice much the same phenomena were observed; infection of the coelomic fluid (earlier in adult bugs than in larvae); packing and swelling of the epithelial cells of the after part of the midgut and frequently of the cells of the Malpighian tubules with bacilli; occasional clumps of bacilli, as from a burst cell, in the lumen of the gut; and freedom of gullet, salivary glands, reproductive organs and other parts from infection. Both histological and experimental observations indicate that an infected bug continues infected for the rest of life. The fresh faeces are infective.

A. A.

GREEN (F. N.). **Leech Infection.**—*Kenya & East African Med. Jl.* 1927. July. Vol. 4. No. 4. pp. 122–123.

In six months the author has had to deal with several cases of leeches, imbibed with drinking-water, remaining fast in some part of the nasopharynx or entrance to the gullet. The time-honoured remedy of a strong salt solution usually disengages them, but in a case where the leech was fixed in the posterior nares the author had at last to resort to chloroform and ether.

A. A.

FORTUYN (A. B. Droogleever). **Notes on the Striped Hamster** (*Cricetulus griseus*, Thomas).—*China Med. Jl.* 1927. Oct. Vol. 41. No. 10. pp. 859–863. With 1 text fig. [7 refs.] [Peking Union Med. College, Peking.]

These notes, which are severely technical, are based on examination of 350 individuals representative of both sexes and of various ages. The author infers, from observation of the parts, that the average number of young in a litter is six; and, from the condition of females collected at particular dates, that the striped hamster is by no means dormant and passive during its "hibernation."

A. A.

MAYER (Mayer), BORCHARDT (Werner) & KIKUTH (Walter). Die durch Milzexstirpation auslösbare infektiöse Rattenanämie (Ätiologie, Pathologie und Chemotherapie). [**The Infectious Anaemia of Rats after Spleen Removal.**]—*Beihefte z. Arch. f. Schiffs- u. Trop.-Hyg.* 1927. Vol. 31. No. 4. pp. 295–317. With 3 plates (1 coloured) & 2 charts. [14 refs.]

This is a matter-of-fact investigation of the phenomena of the pernicious anaemia that occurs in rats (both tame and wild) after removal of the spleen. The authors confirm the view that it is an infective disease due to minute parasites—here beautifully figured—within the red blood corpuscles. These parasites, which stain well with Giemsa and can be cultivated (sometimes to the third generation) in Noguchi medium, they consider to be closely related to the *Bartonella* of Oroya fever and also to have affinities with *Grahamella*—and with *Rickettsia*. The parasites can be passed to other spleen-bereft rats by intracardial inoculation, and also to the spleen-bereft hamster and mouse, although in the two last obvious blood-changes are not evident. Organic arsenic compounds were found to be specific remedies. The authors do not venture beyond the conclusion that they are dealing with an infection of rats which, though very widespread, is latent (until the spleen be removed). They think the infection may be introduced through the gastro-intestinal tract and may lodge in the cells of internal organs, but very sparsely in the blood. The incitement to multiplication in the peripheral blood after removal of the spleen naturally opens up the question of the protective significance of the spleen in other kinds of anaemia, and in Oroya fever.

A. A.

HEGNER (Robert). **Excystation in Vitro of Human Intestinal Protozoa.**—*Science.* 1927. June 10. Vol. 65. No. 1693. pp. 577–578. [6 refs.] [Sch. of Hyg. & Pub. Health, Johns Hopkins Univ., Baltimore.]

The author reviews observations of others who have described excystation, severally, of *Entamoeba histolytica*, *Iodamoeba williamsi*, and the species known to some as *Councilmania lafleuri*, under simple conditions of temperature (about 37° C.) and moisture; and he here describes his own observation, under those simple conditions, of excystation of *E. coli*, *Endolimax nana*, and *Chilomastix mesnili*, and also of preparation for excystation in *Giardia lamblia*. He therefore concludes against the theory that hospiciary digestive solvents are necessary for the liberation of the encysted parasite.

A. A.

HEGNER (R. W.). **Homologies and Analogies between Free-Living and Parasitic Protozoa.**—*Amer. Naturalist*. 1926. Nov.-Dec. Vol. 60. pp. 516-525. [Dept. Med. Zool., Sch. of Hyg. & Pub. Health, Johns Hopkins Univ., Baltimore & London Sch. of Hyg. & Trop. Med.]

The author compares the structure, life-cycle, habitat, and activities of *Amoeba proteus* and *Entamoeba coli* in particular and of other free-living and other parasitic protozoa in general terms, to illustrate the fact that the workings of existence are governed by the same principles in both kinds of organisms—free-living and parasitic.

A. A.

BISHOP (Ann). **The Effect of Increased and Decreased Oxygen Pressure upon the Intestinal Protozoa of *Macacus rhesus*.**—*Parasitology*. 1927. Dec. Vol. 19. No. 4. pp. 401-404. [14 refs.] [National Inst. for Med. Research, London.]

CLEVELAND found (see this *Bulletin*, Vol. 22, pp. 835, 836) that by increased oxygen pressure the intestinal protozoa of termites ("white ants") were killed—though in his experiments with a vertebrate animal (rats) under such pressure ($3\frac{1}{2}$ atmospheres) the intestinal protozoa were still alive when their hosts had succumbed. From experiments with two rhesus monkeys, carefully enunciated in the present paper, it is concluded that "an increase in oxygen pressure, within the limits tolerated by a monkey, has no real effect in eliminating the intestinal protozoa. A decrease in the pressure of oxygen also is without effect. It is therefore highly probable, as Cleveland indicated, that such a method is useless as a means of eliminating protozoa from human hosts." For the technique of experiment under varied oxygen tension reference is given to papers by J. A. CAMPBELL in *Jl. Physiol.*, 1927, Vol. 63, p. 325, and *Brit. Jl. Exp. Path.*, 1927, Vol. 8, p. 347.

A. A.

VOGEL (W. L.). **A Gram-Positive Diplococcus in Human Protozoal Infections.**—*Jl. Infect. Dis.* 1927. Oct. Vol. 41. No. 4. pp. 317-328. With 1 chart in text. [16 refs.] [Clinical Lab., Riverside, & General Hosp., Los Angeles, California.]

An account of a gram-positive diplococcus, differing immunologically from the haemolytic streptococci and the diplococcus of pneumonia, found in the intestinal flora of 54 out of 119 cases of suspected amoebiasis. Protozoa were found in 79 of the 119 cases, and pathogenous species of protozoa (chiefly *E. histolytica*) in 59 of the 79, and the diplococcus was observed in 54 of those 59. Emetine and stovarsol are not mortal to the diplococcus, and it is surmised that the organism may contribute to the pathology of protozoan infections especially in those cases that do not yield to treatment.*

A. A.

*BARZON & LOGAN report as the etiological factor in ulcerative colitis an organism which Vogel believes to be identical with this diplococcus. (*Arch. Int. Med.* 1925. Vol. 36, p. 818).

PICKARD (Rawson J.). **The Ameba *Councilmania Lafleuri*: its Appearance and Clinical Importance.**—*Jl. Lab. & Clin. Med.* 1927. Aug. Vol. 12. No. 11. pp. 1037-1047. With 42 text figs. [13 refs.]

A painstaking description of phenomena, and reiteration of arguments in favour of the validity of *Councilmania lafleuri*, interestingly and well marshalled. The author believes the amoeba *Councilmania* to be pathogenic in the manner that the small races of *E. histolytica* are pathogenic, causing low grade neurotoxic disorders and constipation; and that if *Councilmania lafleuri*, KOFOID and SWEZY, is not an acceptable species, then *E. coli* must be accepted as becoming pathogenic at times, undergoing at the same time structural changes that are pathognomonic of the change and permanent.

He also writes: "If the goddess of science has a form of worship it is the religion of doubt" [and the doubt is whether the permanent structural characters that distinguish *lafleuri* are natural or artefacts].

H. M. Hanschell.

WIGHT (T. H. Toynbee) & PRINCE (L. H.). **Artifacts in Endamoebae which have led to the Naming of a New Genus and Species.**—*Amer. Jl. Trop. Med.* 1927. Sept. Vol. 7. No. 5. pp. 287-309. With 7 plates. [12 refs.]

The authors renew their criticism of the specific validity of *Councilmania lafleuri*. We can indicate in an abstract no more than the general scope and content of an interesting and important work. The case, as presented in this paper, they claim to rest primarily on the series of excellent photographs which give graphic support to everyone of their contentions. So far they have discovered nothing to disprove their claim that rigidity of cyst wall, evidenced principally by irregularity of contour, and which has been subjected to terrific osmotic pressure, is responsible for the manufacture of this new species. KOFOID's observations of "budding" in a saline preparation in which he saw the "budded" amoebula move away from the cyst may have been a pathological process dependent on extremely applied pressure. This observation requires confirmation. It is undoubtedly an extremely rare occurrence. The authors are of opinion that "budding" forms of *E. coli*, *E. histolytica* and *I. bütschlii* are mechanical effects: and that the naming of new species in connexion therewith is not justifiable, and that if *Councilmania lafleuri* be a legitimate species, then there are also other legitimate species bearing similar relations to *E. histolytica* and *I. bütschlii* to which personal names or other euphonious appellations might reasonably be given.

H. M. Hanschell.

SMITH (Septima C.). **Excystation in *Iodamoeba Williamsi* in Vivo and in Vitro.**—*Science.* 1927. Jan. 21. Vol. 65. No. 1673. pp. 69-70. [Sch. of Hyg. & Pub. Health, Johns Hopkins Univ., Baltimore.]

Guineapigs into whose stomach washed cysts of *Iodamoeba williamsi* had been injected were killed at intervals of one, three, four and six hours. No excystation occurred within one hour, but excysted amoebae were observed at three hours in the jejunum and ileum, and at four and

six hours in the ileum and caecum. Thus excystation of this amoeba may occur in the guineapig within a term of 3 hours. However, that excystation does not necessarily result in infection is proved by the fact that a number of guineapigs fed on repeated doses of viable cysts did not become infected.

Washed cysts of *I. williamsi* incubated at about 37° C. in normal saline were observed to be excysting usually at about 5 hours.

A. A.

GITTINGS (John C.) & WALTZ (Arthur D.). *Dientamoeba fragilis*.—*Amer. Jl. Dis. Children*. 1927. Oct. Vol. 34. No. 4. pp. 542-546. [4 refs.] [Children's Hosp., Philadelphia.]

The existence of some eosinophilia in three asthenic and somewhat ill-nourished children led to examination of stools and the revelation of *Dientamoeba fragilis*. The authors consider it possible, yet "problematic," that the amoeba was the cause of asthenia.

A. A.

ČAPEK (Alfred). Die Flagellaten-Urethritis des Mannes. (Vorläufige Mitteilung.) [**Flagellate Urethritis of Man.**].—*Med. Klin.* 1927. Oct. 7. Vol. 23. No. 40 (1191). pp. 1535-1539. With 7 text figs. [17 refs.] [General Hosp., Iglau.]

The author reviews at some length four published cases known to him where *Trichomonas vaginalis* was observed in the urine of males, and he describes in some detail two similar cases that have occurred in his own practice. In both cases besides the active flagellates there was blood in the urine; in one case there was pain in the urethra, in the other case pain in the right testicle; in one case also the patient was a married man whose wife had slight colpitis with *Trichomonas* in the mucus. The author discusses these cases and considers that *Trichomonas urethritis* is a venereal disease, in which more or less blood is always to be found in the urine and a purulent or fibrinous exudation may be observed at the meatus; probably also there is a concurrent bacterial infection of the anterior part of the urethra.

The author appends a series of crude figures which he thinks represent a pair of the flagellates fused preparatory to reproduction. The weird and dissimilar changes that each individual undergoes are described in detail (and also in general, as "complicated").

A. A.

HOGUE (Mary Jane). **Trichomonas in Urine.**—*Amer. Jl. Trop. Med.* 1927. Sept. Vol. 7. No. 5. pp. 327-330. [14 refs.] [School of Med., Univ. of Pennsylvania.]

In a systematic search for *Trichomonas* in the urine from 516 patients male and female, the organism (*T. hominis*) was found in only one case, and that was from faecal contamination. Subsequent to publication the author received from outside three specimens of urine containing *T. vaginalis*.

A. A.

VAVILOVA (N. M.). **Some Observations of *Trichomonas vaginalis*.**—*Russian Jl. Trop. Med.* 1927. Vol. 5. No. 8. English summary pp. 534–535. [In Russian pp. 518–520. With 2 figs. 19 refs.] [“Sneguirov” Hosp., Moscow.]

The English summary states that the author found *Trichomonas vaginalis* in 35 out of 100 in-patients in Moscow, and in 28 out of 100 out-patients in Bokhara, the reaction of the vaginal secretion usually being acid: that the presence of blood in the secretion was favourable to their multiplication; that in the whole 200 cases they were found only once in the urethra and not once in the cervix; and that in a case of chronic gonorrhoea they were packed in large numbers in two para-urethral passages.

A. A.

HEGNER (Robert) & RATCLIFFE (Herbert). **Trichomonads from the Vagina of the Monkey, from the Mouth of the Cat and Man, and from the Intestine of the Monkey, Opossum and Prairie-Dog.**—*Jl. Parasit.* 1927. Sept. Vol. 14. No. 1. pp. 27–35. With 4 text figs. & 4 figs. on 1 plate. [School of Hyg., Johns Hopkins Univ., Baltimore, Md.]

From the four quadrupeds mentioned in the title as many new species of *Trichomonas* are here described, not without some reluctant discussion, but with some illuminative figures. Measurements of vaginal and of intestinal trichomonads of the same monkeys were practically coincident, and since no morphological differences were evident, the authors incline to the opinion that the vagina both in monkeys and in man becomes infected with trichomonads from the intestine.

“A comparison of specimens of *T. macacovaginae* taken directly from the vagina of the monkey with specimens taken from serum-saline-citrate cultures after a period of 51 days showed an increase in size due probably to favourable conditions of nutrition in the culture medium”; comparable differences were observed in the case of *T. hominis* from fresh faex and after culture for 13 days.

A. A.

ESCOMEL (Edmundo). El tratamiento de la tricomonosis intestinal: un asunto concluido. [**The Treatment of Intestinal Trichomoniasis.**]—*Gac. Med. de Caracas.* 1927. May 31. Vol. 34. No. 10. pp. 145–146.

The author's treatment is as follows: a spoonful of a mixture containing 2–4 gm. of essence of turpentine in 150 gm. emulsion every two hours for three days. Every night and morning an *evacuant* enema of a litre of decoction of eucalyptus, followed by a second enema of 4 spoonfuls of hot water, 10–20 drops of laudanum, and the yolk of an egg beaten up with 20–30 drops of essence of turpentine, to be retained till the next enema is due (12 hours), if possible. It is stated that *Trichomonas intestinalis* is usually harmless, but when it does acquire pathogenicity it causes death in 90 per cent. of cases. The turpentine is specific for this parasite exclusively.

H. Harold Scott.

GUPTA (A. K. Dutt). **The Possible Pathogenicity of *Giardia intestinalis*.**—*Indian Med. Gaz.* 1927. Oct. Vol. 62. No. 10. pp. 561–562.

In a routine examination of stools (1,750) at the Calcutta Hospital for Tropical Diseases, 6·2 per cent. of the patients concerned were found to be harbouring *Giardia intestinalis*, concurrently in 24·5 per cent. of them with *Entamoeba histolytica*, although in the majority of the cases the stools were not dysenteric in character (except that many of them contained Charcot-Leyden crystals). In the author's experience, diarrhoea, with passage of *Giardia* cysts, often persists after a patient has been treated for an amoebic infection—a fact that indicates the pathogenous character of *Giardia*. The author finds that stovarsol, though sometimes efficacious, does not always overcome the *Giardia* infection.

A. A.

MARCELLUS (M. B.). **An Unusual Case of *Giardia intestinalis*.**—*U.S. Veterans' Bureau Med. Bull.* 1927. Sept. Vol. 3. No. 9. pp. 925–928. [U. S. Veterans' Hosp., Portland, Oreg.]

A chronic case—dating from the Hispanio-American war, and beginning, in the Philippine Islands, as diarrhoea and dysentery—of painful and severe gastro-intestinal disorder, treated by divers physicians at various times during 28 years as gall-stone, cholecystitis, or malignant disease of gall-bladder or stomach or bowels, and now (July 1926) sent to hospital as an urgent case of questionable gall-stones. At admission the patient was suffering from constant vomiting and appeared moribund, he was anaemic, emaciated, and fevered at evening. Examination of stools disclosed nothing; but tubage of the gall-bladder yielded myriads of active *Giardia*. After a single intravenous injection of 0·9 gm of neosarsphenamine his temperature became normal, and after the fourth injection there were no signs of flagellates in the tubage. During four months in hospital, though he had two recurrences of flagellates (which were cured very quickly by neosarsphenamine), he gained 35 lb., and he was then discharged declaring himself to be "in the best health enjoyed for many years." Readmitted 3 months afterwards he complained mostly of eczema of both shins; active flagellates were found by tubage and disappeared after neosarsphenamine treatment. It is noted that gastro-intestinal symptoms accompanied only one of the recurrences, and then were slight; also that at the third intravenous injection of arsphenamine, the duodenal tube being in operation *in situ*, only dead and distorted flagellates were seen in the tubage 15 to 20 minutes after the administration of the injection.

A. A.

MADINAVEITIA (J. M.), RUIZ (Antonio) & RAMIREZ (Probo). Sobre la supuesta lambliasis vesicular. [So-called Lambliial Infection of the Gall-bladder.]—*Rev. Méd. de Barcelona.* 1927. July. Year 4. Vol. 8. No. 43. pp. 98–102. With 3 text figs.

The authors maintain that *Giardia intestinalis* come from the duodenum. They appear to infer that WESTPHAL & SMITHIES were mistaken in thinking that they saw *Giardia* in extirpated bladders.

H. Harold Scott.

VILARDELL (Jacinto). Rectitis ulcerativa tuberculosa y lambliasis. [Tuberculous Ulceration of the Rectum and Infection with *Giardia*.]—*Rev. Méd. de Barcelona*. 1927. Aug. Year 4. Vol. 8. No. 44. pp. 187–192. With 8 text figs. (6 coloured.)

The author records a case of pulmonary tuberculosis of several years' standing, later associated with tuberculous ulceration of the rectum and the presence of *Giardia intestinalis*. Sanocrysin was given, but with little effect until the parasites had been got rid of by the use of stovarsol and treparsol, when marked improvement in the pulmonary condition occurred and the rectal ulcers healed. He is firmly of opinion that the two conditions are associated as cause and effect.

H. Harold Scott.

HEGNER (Robert). **The Viability of Cysts of *Giardia lamblia* from Man in the Stomach of the Rat.**—*Amer. Jl. Hyg.* 1927. Nov. Vol. 7. No. 6. pp. 782–785. [7 refs.] [Sch. of Hyg., Johns Hopkins Univ., Baltimore, Md.]

Of cysts of *Giardia lamblia* (from man), 18 to 42 hours old, injected into the stomach of rats some were there killed, but some remained alive within the stomach for as long as 6 hours. When placed in the warm chamber cysts that had been in the stomach from 1 to 6 hours showed signs of activity sooner than control cysts (from identical sources).

A. A.

DA FONSECA (O.). Sur le flagellé *Enteromonas hominis*. [The Flagellate *Enteromonas hominis*.]—*C.R. Soc. Biol.* 1927. Oct. 21. Vol. 97. No. 27. pp. 1086–1087. With 7 text figs.

The author remarks the cosmopolitan range of this species, and describes the occasional occurrence of multiple fission.

A. A.

ROBERTSON (Muriel). **Notes on Certain Points in the Cytology of *Trypanosoma raiae* and *Bodo caudatus*.**—*Parasitology*. 1927. Dec. Vol. 19. No. 4. pp. 375–393. With 39 figs. (18 coloured) on 2 plates. [37 refs.]

The following is the author's own summary :—

"1. *T. raiae* and *Bodo caudatus* are investigated using Feulgen's nucleal reaction in addition to the usual nuclear stains. The nature and value of this method is discussed.

"2. In *T. raiae* the parabasal body or kinetonucleus is found to consist of chromatin as shown by the nucleal reaction. An achromatic element in its composition is suggested in the division by the desmose between the two halves being achromatic.

"The blepharoplast is an achromatic structure. It seems probable that it persists in the aflagellar phase of the trypanosome. In *T. raiae* the division of the blepharoplast precedes but does not apparently orientate the division of the parabasal body. The division of the parabasal body does not present a mitotic figure.

"3. The nucleus in *T. raiae* consists of an achromatic karyosome body with some chromatin surrounding it, there is also chromatin arranged upon the inner surface of the nuclear membrane.

"4. At division the karyosome apparently draws out into an achromatic spindle figure, the chromatin collects in the prophase into a loose granular mass and then becomes arranged at the equator. The mass divides into

two portions ; it is not possible to distinguish chromosomes with sufficient certainty. The nuclei are finally reconstructed from the achromatic ends of the spindle and the chromatin which has travelled to either pole.

" 5. In *Bodo caudatus* the parabasal body (kinetonucleus) is composed of chromatin and of an achromatic substance, the blepharoplasts or basal granules are achromatic bodies which play an orientating part in the division of the parabasal body : this division does not show an equatorial plate stage. The nucleus is made up of an achromatic nucleolus-karyosome surrounded by a hollow sphere of chromatin ; there is a very definite division process which takes place apparently within the nuclear space. There is no equatorial plate formed and the achromatic figure which is derived directly from the karyosome is a division column which inserts itself into the already dividing chromatin and is not of the spindle fibre type found in the mitosis of the metazoan cell and of many protozoa."

A. A.

BOUROVA (L. F.). Sur les grains metachromatiques des leishmania et des trypanosomes ; leur rapport avec la virulence. [**Metachromatic Granules of Leishmania and Trypanosomes and their Relation to Virulence.**].—*Russian Jl. Trop. Med.* 1927. Vol. 5. No. 8. French summary p. 525. [In Russian pp. 520–525.]

The French summary states that the author has recognized metachromatic granules in *Leishmania* and declares them to be the product of the internal metabolism ; that he has observed them also in trypanosomes (*T. brucei* and *equiperdum*) where they vary greatly according to the species of host and the intensity of its infection ; and that he considers them to be the support of toxins.

A. A.

SCHULE (Paul A.). *Isospora hominis* : a Second Case of Infection in the Philippine Islands.—*Amer. Jl. Trop. Med.* 1927. July. Vol. 7. No. 4. pp. 217–219. [4 refs.] [U.S. Army Med. Dept. Research Board, Manila.]

The author notes that about 150 cases of infection with *Isospora hominis* (Rivolta) Dobell, 1919, have been reported. About one-half of these were recorded during and immediately after the Great War. It was suggested that the infection was contracted by service in the Near East or by contact with troops returning from that area. Seven infections were found in American soldiers returning from over seas ; but four more were found in Americans who had had only home service. The geographical distribution of cases more recently reported indicates that the area of endemicity probably includes all tropical and sub-tropical countries.

Only one case of infection had heretofore been reported from the Philippine Islands—by HAUGHWOUT (1921) who suggested that infection might have been acquired in the United States. [See this *Bulletin*, Vol. 19, p. 105]. The case now reported undoubtedly occurred in the Philippine Islands. The patient, a white woman, 35 years old, had not been out of the Philippine Islands for 6 years. She had suffered for two months from epigastric distress and pain, intermittent diarrhoea, nausea, tiredness. Stools were partially formed, and not unusual in any respect save for the presence of oöcysts of *I. hominis* (Professor F. G. HAUGHWOUT confirmed the diagnosis).

The author refers to CONNALL'S (1922) case of laboratory infection with *I. hominis* ; the patient suffered from diarrhoea, abdominal discomfort, flatulence, loss of weight, lassitude [*Tom. cit.*, p. 822.]

CONNAL emphasized that oöcysts appeared in the faeces only during a short period toward end of illness, "when the oöcysts appear in the faeces, the acute phase of the illness is over." This explained failure to find the parasite more frequently in other possible cases.

H. M. Hanschell.

HUFF (Clay G.). **Studies on the Infectivity of Plasmodia of Birds for Mosquitoes, with Special Reference to the Problem of Immunity in the Mosquito.**—*Amer. Jl. Hyg.* 1927. Nov. Vol. 7. No. 6. pp. 706-734. With 4 figs. [19 refs.] [Sch. of Hyg., Johns Hopkins Univ., Baltimore, Md.]

The author produces evidence of several species of Culicines observed by him to be susceptible to one or other species of bird Plasmodium, and of several species apparently insusceptible. He approached this question of immunity on the assumption that it might be explicable by a difference in digestive power, and fed a highly susceptible species (*Culex pipiens*) and a naturally immune species (*Aedes sollicitans*)—both being huge feeders and equally voracious—on birds heavily infected with *Plasmodium cathemerium*. The length of life of the asexual parasites in the stomach was observed to be the same in both species (5-6 hours) although in *Ae. sollicitans* parasites could be observed, changed, for about 14 hours longer; ookinetes made their appearance in both species in 12 hours and 'remained until the end of the series;' till 20 hours in *Ae. sollicitans* and 39 hours in *Culex pipiens*; the digestion of red cells "in general required about the same time in each species." Of the different powers of digestion theory there is here no clear proof and the author awaits further observation and experiments.

A. A.

MACDOUGALL (Mary Stuart). **The Effects of Changes in the Sugar Content of the Blood on Bird Malaria.**—*Amer. Jl. Hyg.* 1927. Sept. Vol. 7. No. 5. pp. 635-647. With 6 text figs. [11 refs.] [Sch. of Hyg., Johns Hopkins Univ., Baltimore, Md.]

In experiments of which the results are here recorded in the form of graphs and tables, various batches of canaries inoculated with a given strain (Hartman strain) of the parasite of bird-malaria were fed severally with dextrose, either continuously or at different intervals, during the course of infection; or were injected in the same manner with insulin; or received insulin and then dextrose. The conclusion is that increase in the sugar of the blood is favourable for the parasite, and decrease unfavourable.

A. A.

ARAGÃO (Henrique de Beaurepaire). Evolution de l'*Haemoproteus columbae* et du *Trypanosoma hannai* dans la *Lynchia maura* Bigot. [**Development of *H. columbae* and *T. hannai* in *Lynchia maura*.**]—*C.R. Soc. Biol.* 1927. Aug. 26. Vol. 97. No. 25. pp. 827-829. With 3 figs. [Oswaldo Cruz Inst., Rio de Janeiro.]

The author [who, with others, formerly dissented] has now verified Mrs. ADIE's discovery of a sporogony of *Haemoproteus columbae* in

Lynchia maura quite similar to that of *Proteosoma* and *Plasmodium* in mosquitoes. In the course of operations he discovered in the gut of *Lynchia maura* Crithidia-forms of the pigeon trypanosome (*T. hannah*).

A. A.

LAMBERT, Jr. (Samuel W.). **Sarcosporidial Infection of the Myocardium in Man.**—*Amer. Jl. Path.* 1927. Nov. Vol. 3. No. 6. pp. 663-668. With 2 figs. on 1 plate. [13 refs.] [Presbyterian Hosp., New York, N.Y.]

Case of a West Indian negress, age 32, who died the day after admission into hospital. At post-mortem examination oval masses (82 by 31 microns diameter) of small sickle- or spindle-shaped organisms were observed in sections of the intraventricular heart-muscle. These are judged to be an early developmental stage of some sort of *Sarcosporidia*. "There were no symptoms during life which could be referred to this infection."

A. A.

VASUDEVAN (A.). **A Case of Sarcosporidial Infection in Man.**—*Indian Jl. Med. Res.* 1927. July. Vol. 15. No. 1. pp. 141-142. With 9 figs. on 2 plates (3 coloured).

In muscle exposed in the bed of a meandering, undermining, chronic ulcer in the region of the nipple the author discovered a multitude of filamentous sarcocysts generally resembling, but much longer than Miescher's tubes. The spores are smaller and slenderer than Rainey's corpuscles, have both ends pointed, the nucleus not terminal (but sub-terminal, or even sometimes central), and the polar capsule indistinct and ill-defined, or absent. The author considers it to be a new species of *Sarcocystis*. Sections of the ulcer do not reveal any cysts or spores in the skin or subcutaneous tissue, and the author leaves the question open whether or not the ulceration may be due to sarcocystin. The ulcer and spores are well shown, in colour.

A. A.

JAMESON (A. Pringle). **The Behaviour of *Balantidium coli* Malm. in Cultures.**—*Parasitology.* 1927. Dec. Vol. 19. No. 4. pp. 411-419. With 15 text figs. [9 refs.] [Inst. of Animal Path., Cambridge.]

The following is the author's summary :—

"*Balantidium coli* (from the domestic pig) can be readily cultivated in the medium devised by Dobell and Laidlaw (1926) for the cultivation of entozoic amoebae (inspissated horse-serum and Ringer-eggwhite, with solid rice-starch). If the hydrogen-ion concentration does not exceed the limits pH=5.4-8.0, rich cultures can be obtained in this medium, at 37° C. ; and strains of the ciliate can be readily propagated for any desired period if sub-cultures are made every 3-5 days.

"In such cultures conjugation occurs periodically ; but encystation has never been observed, and all attempts to induce it under cultural conditions have hitherto failed.

"The conjugation of *Balantidium*, as seen in cultures, is peculiar, but it has been impossible as yet to elucidate all details of the process. Conjugants are always much smaller than non-conjugants, and frequently unequal in size. Apparently but one conjugant is fertilised, and survives as an exconjugant—the partner dying after separation.

"Encystation has never been seen to follow conjugation, as described by Brumpt (1909)."

A. A.

DA CUNHA (Aristides Marques) & MUNIZ (Julio). Sobre os ciliados do genero *balantidium* parasitos dos macacos. [*Balantidia Parasitic in Monkeys.*]—*Bol. Biol.* São Paulo. 1927. Apr. 11. No. 5. pp. 6-15. With 13 figs. [Oswaldo Cruz Inst., Rio de Janeiro.]

— & —. Ciliés du genre *Balantidium*, parasites des singes.—*C.R. Soc. Biol.* 1927. Aug. 26. Vol. 97. No. 25. pp. 823-825. With 1 text fig. [Oswaldo Cruz Inst., Rio de Janeiro.]

Description with numerous fine figures of *Balantidium aragaoi*, a new species, from the large intestine of *Cebus caraya*. It agrees with *B. caviae* in having a spheroid macronucleus, but differs in having two contractile vacuoles. The authors illustrate their description by comparison with *B. coli*, *suis*, *caviae*, and the *Balantidium* from *Cebus variegatus* described and figured by HEGNER and HOLMES.

A. A.

HOARE (Cecil A.). *Studies on Coprozoic Ciliates.*—*Parasitology.* 1927. Aug. Vol. 19. No. 2. pp. 154-222. With 96 figs. on 5 plates & 3 text figs. [102 refs.] [Wellcome Bureau Sci. Research, London.]

A comprehensive and critical—and withal highly interesting—study of three species of holotrichous ciliate Infusoria, namely *Lembus pusillus*, *Cyclidium glaucoma*, and *Uronema nigricans* (= *Uronema marinum*), which, although living free in both fresh and salt water, have a predilection for waters that are foul and may even be at home in certain states and kinds of faeces. Their medical interest lies in the accident that, in the author's well-justified opinion, one or other—perhaps all—of them have at times, under the pseudonym "*Uronema caudatum*," been wrongly styled pathogenous parasites of man. In the case of each species a very full account is given of synonymy, natural affinities, history in the zoological annals, structural details, behaviour, and bionomy. In order to establish the relation of the marine to the freshwater forms of the same species experiments on reciprocal acclimatization were made. All three species were cultivated in liquid dilutions of human (and other) faeces, preferring a slightly alkaline medium. *Cyclidium* could not be grown on pure (undiluted) faeces, but *Lembus* and (on one occasion) *Uronema* could. Cyst formation was observed in *Lembus pusillus* and is here described for the first time. The paper is finely illustrated.

Among his methods of investigation the author speaks highly of a technique recommended by SCHEWIAKOFF as particularly useful for demonstrating ectoplasmic detail for temporary observation.

"The infusoria placed in a drop of water on the slide are fixed with the vapours of osmic acid (1 per cent.). Then 1-2 drops of a weak (2-4 per cent.) solution of soda are added to the drop and carefully mixed with it, after which the slide is left uncovered for $\frac{1}{4}$ - $\frac{1}{2}$ hour. The water

evaporates, the solution of soda becomes more and more concentrated and gradually dissolves certain albuminous compounds, bringing out in special relief the ectoplasm, cilia and other ectoplasmatic structures."

A. A.

SHORTT (H. E.) & SWAMINATH (C. S.). *Monocystis mackiei* n. sp. Parasitic in *Phlebotomus argentipes*, Ann. and Brun.—*Indian Jl. Med. Res.* 1927. Oct. Vol. 15. No. 2. pp. 539–552. With 18 figs. on 4 plates.

This admirable paper, which is bountifully illustrated, relates the history and describes the ontogeny in detail and in its relation with the ontogeny of the host, and all the morphology and sporogony, and life-cycle of the parasite *Monocystis mackiei*.

In the natural environment the oöcysts are swallowed by the *Phlebotomus* larva; in due result the adult gregarines are found in the alimentary canal and body-cavity of the larva, and in the body-cavity of the pupa; and they pair and pursue the usual processes of sporogony in the adult *Phlebotomus*. Ripe oöcysts eventually break into the oviduct of the fly and issue in hundreds when the fly discharges its eggs. In its natural environment, therefore, the egg is beset by oöcysts, so that when the larvae issues from the egg some oöcysts must be swallowed at its first feed.

A. A.

DESCHIENS (R.), LIMOUSIN (H.) & TROISIC (J.). Éléments présentant les caractères d'un protozoaire sanguicole observés chez le chimpanzé. [Structures suggesting a Blood Protozoon in Chimpanzee.]—*Bull. Soc. Path. Exot.* 1927. July 13. Vol. 20. No. 7. pp. 597–600. With 1 text fig. [3 refs.]

Description, figure, and discussion of a microscopic filiform organism, of appearances suggestive of *Sergentella hominis*, observed in the peripheral blood of a young chimpanzee under treatment for bacillary dysentery.

A. A.

HEGNER (Robert). Pathogenicity of Human Intestinal Protozoa.—*Arch. Path. & Lab. Med.* 1927. June. Vol. 3. No. 6. pp. 1009–1027. [81 refs.] [Johns Hopkins Sch. of Hyg. & Pub. Health, Baltimore, Md.]

A general review, with bibliography, of recent advances in knowledge of this subject.

A. A.

BASILE (Cosimo). Il Parassitismo intestinale lungo il Medio Uebi Scebeli. [Intestinal Parasites in Somalia.]—*Ann. di Med. Nav. e Colon.* 1927. Nov.–Dec. Year 33. Vol. 2. No. 5–6. pp. 269–281. [16 refs.]

Faecal examinations were made of 300 subjects, and parasites, in some form or other, were found in 277 (over 92 per cent.). Two forms were found in 87 instances (29 per cent.), slightly more often than one (28.33 per cent.), and three were present in 66 persons or 22 per cent. As many as seven were found in two instances.

Ancylostoma duodenale heads the list, being found in 93, *Entamoeba histolytica* next, in 90. Schistosomiasis is rare and certainly not endemic.

Sch. haematobium was present in five cases, and *Sch. mansoni* in two only. [Though the number of cases in which the various parasites were seen is given, it is unfortunate that the modes of combination are not stated.]

H. Harold Scott.

CHORINE (V.). Sur la spécificité de l'immunité acquise chez les insectes. [**Specificity of Acquired Immunity in Insects.**]—*C.R. Soc. Biol.* 1927. Nov. 25. Vol. 97. No. 32. pp. 1395-1397. [Pasteur Inst., Paris.]

Answers to the question whether acquired immunity in invertebrates—particularly insects—is specific, or not, are contradictory; from experiments upon the bee-moth (*Galleria melonella*), here briefly described, the author concludes that it is far from being specific in this insect, at any rate for the first 12 days after specific attack. Caterpillars of this species could be immunized against *B. subtilis* var. *galleriae* by vaccines of various other specific microbes, although the resistance was weakened after 12 days. An interesting observation was that a vaccine of *Staphylococcus aureus* imparted immunity against other microbes but not against the staphylococcus itself.

A. A.

SCOTT (Hugh). **Notes on the Distribution and Habits of Culicidae in Central Abyssinia.**—*Bull. Entom. Res.* 1927. Sept. Vol. 18. Pt. 1. pp. 83-89. With 2 text figs. (maps) & 1 plate.

The mosquitoes mentioned in these notes were collected in the region of Addis Ababa and Lake Zwai, at elevations, as the author is aware, above the generally recognized range of malaria. The following species of Anopheles are included in the collection. *A. gambiae*, up to about 7,000 ft.; *A. mauritians*, up to about 7,500 ft.; *A. pharoensis*, up to about 6,000 ft.; and *A. transvalensis*, about 8,000 ft. *A. squamosus* is also mentioned as having been observed near Lake Tana by members of an earlier expedition to Abyssinia.

A. A.

SCHWETZ. Synopsis des moustiques connus du Congo belge avec quelques commentaires et considérations. [**Synopsis of Mosquitoes known in Belgian Congo.**]—*Rev. Zool. Africaine.* 1927. Vol. 15. No. 3. 49 pp.

This paper contains a list of all the known mosquitoes of the Ethiopian region, a list of all the species hitherto observed in Belgian Congo, and a further series of lists of the species observed in each of the particular provinces of that country.

A. A.

DYAR (Harrison G.) & NÚÑEZ TOVAR (M.). Notas sobre insectos hematófagos de Venezuela. (Diptera, Culicidae, Psychodidae). [**Notes on Bloodsucking Insects of Venezuela.**]—*Gac. Med. de Caracas.* 1927. June 30. Vol. 34. No. 12. pp. 186-187.

A purely entomological paper containing descriptions of a new species of *Haemagogus*, of *Culex*, and of *Aedes*, and of the larva of *Culex innominatus* of Evans, and mention of four species of *Phlebotomus* with the synonyms of each, and of *Anopheles apicimacula*—all from Venezuela.

A. A.

WRIGHT (W. Rees). **On the Effects of Exposure to Raised Temperatures upon the Larvae of Certain British Mosquitos.**—*Bull. Entom. Res.* 1927. Sept. Vol. 18. Pt. 1. pp. 91–94. [2 refs.] [Dept. of Agric., Univ. Coll. N. Wales, Bangor.]

In the author's experiments larvae of *Anopheles bifurcatus* were not affected by temperature below 31° C. ; between 31° and 36° C. a varying number did not survive an exposure of 5 minutes ; temperature above 37° C. killed them all, as also did exposure for one hour to a temperature of 35° C. Larvae of *Aedes detritus* were not affected by temperature below 37° C., though all died when exposed to a temperature of 35° C. for an hour ; at 44° C. all became inert, and none revived. Larvae of *Culex pipiens* were not affected at 36° C. ; none survived at 40°–41° C.

A. A.

CHRISTOPHERS (S. R.), SINTON (J. A.) & COVELL (G.). **Synoptic Table for the Identification of the Anopheline Mosquitoes of India.**—*Health Bulletin, No. 10. Malaria Bureau No. 2.* 22 pp. With 37 figs. on 5 plates. 1927. Calcutta : Government of India Central Publication Branch.

COVELL (G.). **Anti-Mosquito Measures.**—*Health Bulletin, No. 11. Malaria Bureau No. 3.* 24 pp. 1927. Calcutta : Government of India Central Publication Branch.

These are plenary official publications—admirable, though not containing anything original. No. 10 provides the means of identifying the Indian species of *Anopheles* with a minimum of entomological apparatus : No. 11 is a well-considered and convenient survey of well-approved methods of restraining and suppressing mosquitoes and their larvae, chiefly from the malaria standpoint.

A. A.

STRICKLAND (C.) & CHOWDHURY (K. L.). **An Anopheline Survey of the Bengal Districts.**—*Indian Jl. Med. Res.* 1927. Oct. Vol. 15. No. 2. pp. 377–426. [11 refs.] [School of Trop. Med., Calcutta.]

The ultimate object of this survey is to help to elucidate the question whether there be any agreement between a local prevalence of specific anophelines and local variation in the incidence of malaria, in Bengal. The survey, which embraced 25 of the 27 districts of the Province, was continued for six months (from mid-August to mid-February) survey-parties staying for a time at certain "centres" in each district and collecting larvae and adults there and thereabout. The greater part of the report consists of tabulated information [to some extent reduplicated] regarding the numbers and percentages of larvae of each species collected in each "centre," district, and administrative Division, and the distribution of larvae of each species in its breeding-grounds of various kinds in each centre and district. The tables also include a numerical list of the species of adult anophelines caught at various places.

Of the 17 (or 18) species found during the survey, only four (or five) were found in large numbers, namely : *A. sinensis* (40·1 per cent.), *A. fuliginosus* (25 per cent.), *A. rossii* and *vagus* (15·4 per cent.),

and *A. barbirostris* (9.4 per cent.). Of less frequent occurrence were *A. aconitus* (3.6 per cent.), *A. culicifacies* (2.5 per cent.) and *A. pseudo-jamesi* (1.5 per cent.). (The percentages are calculated from 9,000 larvae that survived for examination).

Of all natural breeding-grounds for *Anopheles* the most abundant in Bengal are abandoned or drying river-channels. Other nurseries here enumerated and defined are tanks, if not quite choked with water-hyacinth and other weed; *Khals* (channels connecting rivers or draining from swamps) if not full of muddy water; small streams; cutcha drains; irrigation canals; swamps and *bheels*; pools of rain-water, and pools in river-beds even when bare of weed; road-side ditches; borrow-pits in villages and along road and railway embankments, unless they are full of muddy water; paddy-fields; and jute-fields, except when the cut jute is steeping in them. (Tree-holes—usually bamboo—fill up with rainwater and are tenanted only by culicines).

The authors include a short review of the papers and reports of previous observers of the anophelines of Bengal.

A. A.

MELENEY (Henry E.), LEE (C. U.) & CHANG (H. L.). **A Preliminary Survey of the Anopheline Mosquitoes of the Peking Area.**—*China Med. Jl.* 1927. June. Vol. 41. No. 6. pp. 509–512. [2 refs.] [Peking Union Med. Coll., Peking.]

Three *Anopheles* species—*A. hyrcanus* var. *sinensis*, *A. pattoni*, and *A. lindesayi*—occur in the neighbourhood of Peking. The first, which is probably the carrier of malaria on the surrounding plains, breeds only on the plains and at the foot of hills, in ponds, rice-fields, and sluggish streams. The second breeds mostly in hill streams, but sometimes in ponds at the foot of hills. The larvae of *A. lindesayi* were found in a spring at about 1,050 ft.

A. A.

KOIDZUMI (Makoto) & HAKUSHI (Rigaku). **The Anophelines of Formosa.**—*Taiwan Igakkai Zasshi (Jl. Med. Assoc. Formosa)*. 1927. Oct. No. 271. English summary pp. 1–4. [In Japanese.]

In the catalogue of *Anophelines* of Formosa the author includes nine species, namely: *A. sinensis*, *pleccau* ("closely related to *lindesayi*"), *minimus*, *candidiensis* (a new species), *tessellatus*, *maculatus*, *splendidus* ("close resemblances" to *maculipalpis*), *hatorii* (probably *ludlowi*), and *fuliginosus*.

A. A.

ZOTTA (G.). **Considérations sur l'anophélisme du delta du Danube. [Anophelism of the Danube Delta.]**—*Bull. Soc. Path. Exot.* 1927. Oct. 12. Vol. 20. No. 8. pp. 801–811. With 1 map in text.

The author describes very briefly, with the addition of a rough chart, the delta of the Danube, and remarks the abundance there of *Anopheles* and the infrequency of malarial fevers. Two species of *Anopheles*

are present—*A. maculipennis* and *A. sinensis*—these being generally associated, in the vicinity of man, with *Taeniorrhynchus richardii* and *Aedes dorsalis*. The Anopheles congregate in stables and other places where domestic animals are housed; few, sometimes not any, are to be found in human dwelling-places; and this remarkable contrast may be observed even in places where but one or two isolated houses stand amid a multitude of shelters for cattle and sheep; the only habitations inside which Anopheles may be plentiful are solitary huts far distant from villages and the range of domestic animals, and inhabited perhaps by a single labourer during the busy summer. The author regards his observations as one more confirmation of ROUBAUD'S "zoophilism."

A. A.

ROOT (Francis Metcalf). **Studies on Brazilian Mosquitoes. IV. Notes on some Brazilian Species of Anopheles.**—*Amer. Jl. Hyg.* 1927. Sept. Vol. 7. No. 5. pp. 599-605. With 11 figs. on 2 plates. [9 refs.]

A purely entomological paper. *Anopheles rockefelleri* of Peryassu is pronounced to be synonymous with *A. mediopunctatus* of Theobald; and *A. tibiamaculata* of Neiva a synonym of *A. eiseni* of Coquillett. *A. fluminensis* is described, from 2 adult males and a larva and 2 pupa-skins, as a new species.

A. A.

SEPULCRI (Piero). Rapporti tra anofelismo ed ambiente nella zona litoranea tra Piave e Livenza. (**The Relations between Anophelism and Environment in the Zone enclosed between the Piave and Livenza Rivers.**)—*Riv. di Malariologia.* 1927. July-Oct. Vol. 6. No. 4-5. pp. 728-750. With 1 map in text. [English summary p. 879.]

Notwithstanding the upset of sanitary order in Venetia during the war and the consequent increase of malaria there, states the summary, things are now so far improved again, that there are some localities where malaria has disappeared, though Anopheles still remains. The author's studies lead him to the conclusion "that if zooprophylaxis acts in such a manner as to diminish the probabilities of the contact between anopheles and man, it is however insufficient to destroy the links of the chain man-haemosporidium-mosquito, which has taken root through a very long period of time." The preference of *A. elutus* for salt waters is also noted.

A. A.

FALLERONI (Domenico). Discussione sulla zooprofilassi e sulla biologia degli anofeli italiani. (**Discussion on the Zooprophylaxis and the Biology of the Italian Anopheles.**)—*Riv. di Malariologia.* 1927. July-Oct. Vol. 6. No. 4-5. pp. 751-777. [English summary pp. 879-880.] [Anti-Malarial Stations of the Pontine Marshes, Italy.]

According to the English summary this paper is a criticism of some papers recently published in the *Rivista*—reports by PECORI and

ESCALAR, by OTTOLENGHI, and by MISSIROLI and HACKETT on anti-malaria operations undertaken by the Roman Government and at Italian experimental stations assisted by the Rockefeller Foundation. The paper also contains its author's own review—already published in this *Bulletin*, Vol. 24, p. 859—of some work of his own.

A. A.

ADOVA & SEBSNZOW. Biologie et constitution physicochimique des tourbières et conditions qui y règlent le stationnement des larves d'anophèles. [**Biology and Character of Bogs in respect to the Presence of Anopheles Larvae.**]*—Bull. Soc. Path. Exot.* 1927. Oct. 12. Vol. 20. No. 8. pp. 811-823. [3 refs.]

In an earlier paper (see this *Bulletin*, Vol. 24, p. 883) the authors stated their conclusion from a laborious survey of certain marshes and bogs in Russia that waters overgrown with bog-moss (*Sphagnum*) are distasteful and sedgy (*Carex*) waters attractive to the breed of *Anopheles*. They now give the results of a further investigation of these and other local waters in an abounding detail that includes not only the organic environment, but also the microcosmic factors (physical, chemical, mineral, electric-conductive, etc., properties of the water) which reasonably may be supposed to operate on the organic environment as a whole rather than directly upon the one selected organism *Anopheles*. The detail is too specific and too much discriminative in its local reference for abstraction, so that the paper itself must be read by those who are interested in a study of much academic interest.

The authors begin by comparing the water in two claypits, one long abandoned, the other recently disused. The old pit (in which *Anopheles* larvae were plentiful) was margined with *Utricularia* and other higher vegetation, the bottom deposit was rich in organic débris, the water was hard chiefly with lime, and of high electric conductivity; the plancton was rich both in numbers and in species, and in the zoo-plancton entomostracous crustacea and rotifers were particularly exuberant. There was no vegetation about the newer pit, and its bottom consisted of pure clay; the water was not so rich in soluble organic matter, was hard chiefly with ferrous oxide, and was of much lower electric conductivity; the plancton was poor both in numbers and species, and in the zoo-plancton there were many rotifers but few entomostracous crustacea; this new pit with its organic environment still "unstabilized" was avoided by *Anopheles*.

The water of a local lake in which *Anopheles* larvae could not be found was examined. It was clear, thick with moss and silkweed at the margin, contained a fair amount of soluble organic matter and algae, and supported a varied fauna; the water, however, was deficient in dissolved mineral matter, particularly lime.

Larvae of *A. maculipennis* were unexpectedly found in a rocky pool smelling of hydrogen-sulphide and thick with silkweed. The water, though overcharged with organic matter was rich in minerals, particularly lime, and was of strong electric conductivity.

Of the authors' conclusions from these and other observations, one of the least diffident appears to be that the tension of a water in lime and other mineral salts is one of the factors that determines the existence there of *Anopheles* larvae.

A. A.

SINTON (J. A.) & COVELL (G.). **The Relation of the Morphology of the Buccal Cavity to the Classification of Anopheline Mosquitoes.**—*Indian Jl. Med. Res.* 1927. Oct. Vol. 15. No. 2. pp. 301–308. With 29 figs. on 5 plates. [8 refs.] [Central Malaria Bureau, Kasauli, India.]

In the female of all the anophelines (except *Bironella* and *Anopheles* s.r.) examined by the authors there is a buccopharyngeal armature consisting of a row, or rows, of stout chitinous "teeth," projecting from the posterior end of the ventral plate of the buccal cavity so as to form a sort of sieve between that cavity and the pharynx. These bucco-pharyngeal teeth were described by ANNETT, DUTTON, and ELLIOTT for *A. costalis*, and their absence in *A. maculipennis* and *punctipennis* was noted by NUTTALL and SHIPLEY and by THOMPSON. The present authors have studied this bucco-pharyngeal armature in 52—mostly Indian—species for evidence of specific peculiarities having phyletic implications; and the results, so far as they go, show a remarkable harmony between the grouping of anophelines by similarities and dissimilarities in the bucco-pharyngeal armature of the female and the grouping based on male genital characters. The authors have not studied a female of the sub-genus *Chagasia*; but otherwise, in all their 52 species (with one exception) the females can, by the general character of the bucco-pharyngeal armature be segregated in four groups corresponding severally with the other four anopheline subgenera as defined by CHRISTOPHERS. Thus in *Anopheles* (11 species examined) and *Bironella* (1 sp.) this armature is absent; in *Myzomyia* (38 sp.) it is very complex; and in *Nyssorhynchus* (2 sp.) it consists of two rows of teeth arising from a characteristic semilunar plate. Furthermore, within the complexities of the subgenus *Myzomyia* the five legions *Myzomyia* (s.r.) *Neocellia*, *Cellia*, *Pseudomyzomyia*, and *Neomyzomyia* can all be discriminated by particular characters of the armature. The structure, in its varieties, is described and well figured in the paper,
A. A.

SHROPSHIRE (James B.) & ZETEK (James). **Unusual Anopheles Habitats in the Canal Zone.**—*Amer. Jl. Trop. Med.* 1927. Sept. Vol. 7. No. 5. pp. 331–338. With 4 text figs. [2 refs.]

Though there is little of surprising novelty in this paper, the details are interesting as illustrating (among other matters) how a sudden and temporary inundation, even if it be mainly due to the sea, may confound for a time all the intelligent anticipations of the sanitary department. Such an unforeseen sport of Neptune, at Punta Bruja in the Bay of Panama, covered 30 acres of dry land with water of high salinity, which, until the spit of sand left by the upheaval of the sea was cut through, was used as a prolific nursery by the notorious *Anopheles albimanus* and *tarsimaculatus*. Even the water impregnated with the caustic juice from fallen fruit of the deadly Manchineal (*Hippomane mancinella*, the most virulent member of the acrid Euphorbia family) which is used locally as a fish-poison, teemed with *Anopheles* larvae, the seawater providing the antidote to the poison.

Another ideal and prolific breeding-ground for the two local *Anopheles* was a brackish swamp choked with the tussocks of the giant polypody fern, *Acrostichum aureum*. Other breeding-places noticed were a water-

trough, iron tanks, dug-outs, crab-holes, and even a tree-hole. Larvae of a third dangerous species, *A. argyrotarsis*, were observed in tin cans lying in shrubbery and tall grass about houses.

A. A.

RODENWALDT (Ernst). **Entomological Notes IV.**—*Meded. Dienst d. Volksgezondheid in Nederl.-Indië*. 1927. Part 3. pp. 514-523. With 3 text figs. [Med. Lab. Weltevreden, Java.]

This paper contains tabulated detail of observed local distribution of *Anopheles*-species in islands and districts of Netherlands India. Good local instances are given of certain instructive phenomena: such as the sudden appearance of *Anopheles ludlowi* at Bencoolen as a sequence to the formation of brackish pools among sand dunes by streams stagnating in a time of excessive drought, and the subsequent local epidemic of malaria; and, again, the introduction of malaria following changes in the anopheline fauna—particularly the immigration of *A. maculatus*—due to clearing of jungle for open plantation. The occurrence of *A. ludlowi* inland at a height above 2,900 ft. is noted; also the absence of the larvae of this species from only some among the inland (freshwater) fishponds of a particular tract where the gross features of the natural environment seem uniform. A variety of *A. aitkeni* is described.

A. A.

GRIFFITHS (T. H. D.). *Anopheles atropos* Dyar and Knab. **A Note on its Breeding and other Habits.**—*Public Health Rep.* 1927. July 22. Vol. 42. No. 29. pp. 1903-1905. [2 refs.]

Anopheles atropos appears to breed only in salt water, its larvae conforming to salinities ranging from 3 to 12 per cent. In certain salt-marsh territories of the Gulf States of the U.S.A. it swarms in tormenting numbers, attacking people in broad daylight as well as at night, and freely invading habitations even at a distance of a mile from the marsh; the resting attitude is something *Culex*-like.

A. A.

BRAGINA (A.). [The Biology of *Anopheles maculipennis*, Mg., with Introductory Notes by E. JUNKOVSKII.] [In Serbian.]—*Glasnik Cent. Hig. Zavoda*. Belgrade. 1926. Vol. 1. (1). Pt. 1-4. pp. 119-145. [Summarized in *Rev. Applied Entom.* 1927. July. Vol. 15. Ser. B. Pt. 7. pp. 122-123.]

This author observes that the female *Anopheles maculipennis* mates before feeding and lays about 200 eggs, on an average, also that the new-hatched larvae feed on bacteria.

A. A.

ZETEK (James). **Rapid Determination of Anopheles Larvae in a New Medium.**—*Amer. Jl. Trop. Med.* 1927. July. Vol. 7. No. 4. pp. 247-249.

This author finds it convenient to identify living *Anopheles* larvae specifically by immersing them in a milky fluid, against the opacity of which the distinctive palmate scales stand out in relief.

A. A.

DUNN (Lawrence H.). **Mosquito Breeding in "Test" Water-Containers.**
—*Bull. Entom. Res.* 1927. Sept. Vol. 18. Pt. 1. pp. 17–22.
[W. Africa Yellow Fever Commission, Lagos, Nigeria.]

During six months—from December to June—the author carried on observations on the breeding of mosquitoes in the compound of the West Africa Yellow Fever Commission at Yaba, near Lagos, in Nigeria. The following conclusions on the breeding of one particular species, *Aedes aegypti*, are given verbatim:—

"It would probably be necessary to continue this observation on the breeding occurring in the 'test' containers over a period of two years or more before a very definite analysis of the results could be made. However, from a consideration of the data presented in the foregoing tables the following conclusions in regard to *Aedes aegypti* appear reasonable:—

"1. A marked preference is shown for bamboo sections over tin cans as a place of oviposition.

"2. Water containing leaves seems to be more attractive to the ovipositing females than water only.

"3. Much breeding may occur in containers that are located one hundred yards from a habitation.

"4. The females may prefer the places of concealment afforded by grass and bush at a short distance from habitations to those in the more immediate vicinity or inside the houses.

"5. A seasonal variation occurs, the prevalence and breeding decreasing during the dry season and increasing with the beginning of the rainy season."

A. A.

DUNN (Lawrence H.). **Tree-Holes and Mosquito Breeding in West Africa.**—*Bull. Entom. Res.* 1927. Dec. Vol. 18. Pt. 2. pp. 139–144.

The breeding of mosquitoes in tree-holes here analysed was studied near Lagos during the rainy season; 260 trees of 36 species, chiefly fruit-trees and ornamental shade-trees, yielded a collection of larvae from which 12,285 adult mosquitoes of 14 species were bred, all being Culicini. These included 1,141 individuals of *Aedes (Stegomyia) aegypti* [vel *argenteus*], being the issue of larvae taken from 26.9 per cent. of the trees searched, some of which were 350 yards distant from the nearest house.

A. A.

DUNN (Lawrence H.). **Observations on the Oviposition of *Aedes aegypti*, Linn., in Relation to Distance from Habitations.**—*Bull. Entom. Res.* 1927. Dec. Vol. 18. Pt. 2. pp. 145–148.

In these observations natural waterpots of bamboo stem were used; and *Aedes aegypti* preferred to deposit its eggs in outdoor pots set among bushes and trees rather than in pots inside houses. The outdoor pots were set 30 and 60 yards, and again at five equal intervals from 100 to 500 yards distant from habitations, and eggs of *Ae. aegypti* were found in the farthest—with no other known source of blood at hand.

A. A.

LEGENDRE (J.). Races de *Stegomyia fasciata* et fièvre jaune. [**Races of *S. fasciata* and Yellow Fever.**]—*C.R. Acad. Sci.* 1927. Nov. 28. Vol. 185. No. 22. pp. 1224–1226. [3 refs.]

The question here proposed is: How comes it that yellow fever, endemic on the west coast of Africa, has never spread to south-eastern Africa or Madagascar or the Mascarene Islands, notwithstanding the existence of *Aedes argenteus* in those places and the known facilities of sea-communication round the Cape in days before the significance of the insect was suspected?

The author surmises that there are two races of *Aedes argenteus*, of which one can transmit yellow fever and the other can not, though both can transmit dengue fever.

Of the existence of two distinct races ["without prejudice"] he has no doubt. One of them, observed by him in Tonkin and Madagascar and Beyrout and called by him the "Oceano-Indian" race, is a small, fine-cut, elegant insect, and its larvae is slender and of a comparatively light colour. The other, which he names "Africano-American," is of a larger and clumsier make, and has coarse dark-coloured larva; this is the yellow fever race with which he has been familiar for two years in the Upper Volta region of West Africa. The author seems to be confident that "experimentation, a minor form of observation," will confirm these epidemiological and entomological facts.

A. A.

CONNAL (Sophia L. M. Summers). On the Variations occurring in *Aedes argenteus*, Poiret, in Lagos, Nigeria.—*Bull. Entom. Res.* 1927. Sept. Vol. 18. Pt. 1. pp. 5–11. With 8 text figs. & 1 plate. [Med. Research Inst., Lagos.]

From the daily collections of the larvae brought to the Medical Officer of Health at Lagos in Nigeria, Mrs. Summers Connal has bred adults of *Aedes argenteus* by the thousand, and with infinite care and patience has scrutinized 2,000 of those adults (a thousand of each sex), all fresh and untarnished, for exact evidence of variation.

Outside the one constant lyre-shaped device on the scutum—but even this is not quite free from diversity in definition and tint—she observes manifold variations, and in the present paper she records those of the abdominal vesture and of the tarsus of the hind legs as being the most conspicuous.

Concerning the abdomen: Although 68.9 per cent. of the thousand females and 85.2 per cent. of the thousand males had the typical proximal ("basal") white crossband on each segment, among the others there were many (110 ♀ and 74 ♂) that had also a distal ("apical") white crossband on each segment; many others (127 ♀ and 46 ♂) that besides this extra distal crossband had a median longitudinal white stripe and the general surface of the segments sprinkled or brindled with light scales; others again (40 ♀ and 21 ♂) in which the abdomen was entirely covered with white scales, to the practical exclusion of black; still others (25 ♀ and 7 ♂) that had the abdomen quite black, or purplish-black; and finally there were 9 females having only a distal ("apical") white crossband on each segment. Moreover, apart from these definite variations in the number and distribution of the white scales, the ground colour of any among the insects might be some shade of brown rather than black.

Concerning the tarsus of the hind legs: In 58.3 per cent. of the thousand females and in 57 per cent. of the thousand males the last (5th) segment of the tarsus of the hind legs was typical, i.e., white. In all the other insects that segment had either a black tip—which might be reduced to a mere spot—or was to some considerable extent— $\frac{1}{2}$ to $\frac{1}{4}$ —black. (These variations in the extent and distribution of the white scales of the terminal segment of the hind legs ranged throughout the whole 2,000 insects; but a typically-marked abdomen and a typically-marked terminal hind tarsal segment were *concurrent* in only 39 per cent. of the females and 47.7 per cent. of the males). Considerable variation was also observed in the relative distribution of white and black scales in the penultimate (4th) segment of the tarsus of the hind legs, as also in the actual proportions of this particular segment. The banding of the first three tarsal segments of the hind legs also showed variation.

A series of breeding experiments was carried out—females with all-white abdomen being mated each with a typical or some kind of non-typical male; some among the varied progeny of these unions were also mated. The results of each experiment are given in numerical and sex detail, but it must be sufficient to notice here the frequent occurrence of variation, distinct from that exhibited in either parent, that occurred among the progeny of both generations.

Experiments were also carried out to test the possible influence of modified light during larval life upon the colouring of the adult—white, black, and reddish-brown breeding-dishes being used in comparison; but no indication of any such influence was detected.

The above is merely a sketch of a most toilsome—and most important—investigation, which, it is hoped, the author may have renewed patience to continue.

A. A.

PETRAGNANI (G.) & CASTELLI (A.). *Le gambusie nella lotta anti-larvale in provincia di Cagliari (con particolare riguardo alla biologia). Larval Control by Means of Gambusia in the Province of Cagliari (with Remarks on the Biology of this Fish).*—*Riv. di Malariologia*. 1927. July-Oct. Vol. 6. No. 4-5. pp. 709-727. [2 refs.] [English summary pp. 878-879.] [Hyg. & Bact. Inst., R. Univ., Cagliari.]

The authors remark the hardihood of *Gambusia holbrooki* and its adaptability to waters fresh or salt or clean or foul or of varied temperature [an obdurate tolerance characteristic of the whole wide-ranging Cyprinodont family to which *Gambusia* belongs]; and they also note its Saturnine voracity for its own young. They state that they rarely find culicine larvae in permanent waters where this fish has been introduced. They recommend its periodic introduction into seasonal waters, in the proportion of one fish to each square metre.

A. A.

HILDEBRAND (Samuel F.). *A Study of the Top Minnow Gambusia Holbrooki in its Relation to Mosquito Control.*—*Public Health Bull.* No. 153. Wash. 1925. May. pp. vi+136. With 15 figs. (13 on 7 plates.) & 52 charts.

The object of this laborious study, which seems to have been pursued for four seasons, was to obtain some accurate information of the value

of the Cyprinodont fish *Gambusia holbrooki* in the suppression of mosquitoes. The observations were made in ponds and temporary swamps. Records of numbers of larvae collected both before and after introducing the fish were kept. In a number of instances sections of ponds that contained fish were divested of their fish, while other sections were left untouched, for comparison. The author describes his experiments [which, of course, can only have an approximation to precise experimental conditions] and their results. The account is too complicated with varying detail to be condensed; but the results are stated to show "in a measure" the efficiency of *Gambusia holbrooki* in the environments studied [ponds and temporary swamps]. The results for all the four seasons show a total reduction of *Anopheles* larvae and pupae of 57.8 per cent., and of *Culicine* larvae of 80.8; but reasons are given, at length, for thinking that the considered data under estimate the value of the fish. The data at any rate "show that the fish brought about very large reductions in mosquito-breeding."

A. A.

LEGENDRE (J.). Poissons larvivores de la Haute-Volta. Technique de l'emploi des poissons contre les maladies à moustiques. [**Larvivorous Fish of the Upper Volta.**].—*Bull. Soc. Path. Exot.* 1927. June 8. Vol. 20. No. 6. pp. 476-480. [18 refs.]

In the Upper Volta district of French West Africa the local fish utilized by the author in dealing with mosquito larvae are the fry of two species of Siluridae (*Clarias lazera* and *Schilbe mystus*) and of a Cichlid (*Tilapia nilotica*).

A. A.

BALFOUR (Andrew). **Mosquito Control: an Historical Note.** [Correspondence.].—*Lancet.* 1927. Oct. 8. p. 790.

In a translation (by one John Parish, dated 1775) of a French book—"A Voyage to the Island of Mauritius," etc., the writer has discovered a proposal to carry frogs to Mauritius to "eat the eggs which the mosquito lays upon the surface of the standing waters."

[Apart from the questionable fitness of frogs for this service (the aquatic tadpole being carnivorous only under unnatural constraint), it may be remarked that the Mascarene Islands (among which Mauritius is included) possess a frog of their own, *Rana mascareniensis*, which is known to have been in existence in Mauritius when Charles DARWIN visited the island in 1836.]

A. A.

PUBLIC HEALTH REPORTS. 1927. Sept. 23. Vol. 42. No. 38. pp. 2337-2338.—**Mosquito Control by Airplane. Memorandum on the Distribution of Paris Green by Airplane in the Control of *Anopheles* Production in Uncleared Pond near Bamberg, S.C., September 8, 1927.** [LE PRINCE (J. A.); LEGARE (A. E.); McLEAN (Norman T.); GRIFFITTS (T. H. D.); WILLIAMS, Jr. (L. L.); COOK (S. S.)]

The great development of hydro-electric power in the U.S.A. has led to special consideration of mosquito control measures for impounded-water reservoirs in which there is often both dense vegetation and, at the margins, much floating material.

The signatories of this report carried out a careful experiment on 500 acres of a pond where vegetation and floating material were abundant and where eleven out of every thirteen dips secured anopheles larvae (average five per dip).

Five hundred pounds of Paris green mixed with a like weight of powdered soapstone was distributed by an aeroplane flying 50 feet above the tree tops and "gridironing the area with paths approximately an eighth of a mile apart."

Twenty-two hours later, 703 dips were made from a boat, securing 3 living anopheles larvae, 84 dead larvae and six living pupae.

J. F. C. H.

DEL NEGRO (Carlos). O verde Paris na prophylaxia da malaria. Trabalho apresentado ao Terceiro Congresso Brasileiro de Hygiene. [In 2 Parts.] [**Paris Green in the Prevention of Malaria.**—*Archivos de Hyg.* Rio de Janeiro. 1927. Sept. Vol. 1. No. 2. pp. 143-191. With 12 photographs & 1 map. English summary to Part I facing p. 158, and Part II facing p. 182.

The author applied 1 litre of Paris Green containing 40 per cent. As_2O_3 mixed with 100 litres of dust to 10,000 sq. metres of water, though a slightly less rate of distribution actually occurred. Such applications at 10 day intervals were effective to control breeding when the temperature range was between $28^{\circ}C.$ and $17.7^{\circ}C.$, though by the end of the period well developed larvae were found. Wind over 6 metres per second interfered with results on open water, but strong wind assists when vegetation is dense. Paris green is reported to have a caustic action on the bladders of *Utricularia oligosperma*.

J. F. C. H.

GRIFFITHS (T. H. D.). **Moist Sand Method of applying Paris Green for Destruction of Subsurface-feeding Mosquito Larvae.**—*Public Health Rep.* 1927. Nov. 4. Vol. 42. No. 44. pp. 2701-2705. [1 ref.]

Hitherto applications of Paris green have not been effective against bottom-feeding mosquito larvae. The author finds that mixture with moist beach sand (1 part to 99 by volume) renders the larvicide lethal both at the bottom and at the surface, most grains of the poison being carried down but sufficient remaining afloat to kill anopheline larvae. The lethal effect at the bottom is maintained for a longer period than it is at the surface with the ordinary dust application.

J. F. C. H.

BARBER (M. A.) & KOMP (W. H. W.). **Some Tests of the Larvicide "Stoxal."**—*Public Health Rep.* 1927. Aug. 5. Vol. 42. No. 31. pp. 1997-2004. [3 refs.]

Stoxal is described as consisting "essentially of trioxymethylene diluted with an inert dust." From their experiments in the southern States of the U.S.A., in May and June, the authors conclude that for Anopheles, Paris green is far cheaper than stoxal, if a dust larvicide is wanted. "For culicines, there are few places where oil or fish would not

be more economical, and in such places trioxymethylene [paraformal] alone, or diluted with some inexpensive dust . . . should be much cheaper than, and fully as efficient as stoxal."

A. A.

BRUG (S. L.) & VAN SLOOTEN (J.). **Report of Some Experiments on the Efficiency as Insecticides of "Flit," "Rids" and of some other Preparations made at the Medical Laboratory at Weltevreden.**—*Meded. Dienst d. Volksgezondheid in Nederl.-Indië*. 1927. Part 3. pp. 524-530. [Med. Lab., Weltevreden, Java.] [Summary appears also in *Bulletin of Hygiene*.]

These insecticides, which are to be used as a spray, are effective in killing both anophelines and culicines, as well as flies. Their effect on cockroaches is doubtful and owing to their poor powers of penetration they are of little value against bed-bugs which cannot be reached in their hiding places by a spray. The sprays are superior to pure kerosene. "Flit" is not regarded as the equal of "Rids" because it stains and has an irritating effect on the skin, conjunctiva and nasal mucous membrane. "Rids" was prepared in the laboratory according to the formula—Kerosene 89.6 parts, carbon tetrachloride 7 parts and methyl salicylate 3.4 parts, and was as effective as the commercial article. The omission of the methyl salicylate does not impair the efficiency of the insecticide and it is claimed that a cheaper and simpler preparation can be obtained by mixing 2 parts of carbon tetrachloride with 100 parts of kerosene.

M. E. Delafield.

MUNRO (A. Campbell). **An Experiment in Mosquito-proofing Barracks of British Troops.**—*Jl. Roy. Army Med. Corps*. 1927. Oct. Vol. 49. No. 4. pp. 248-255. With 1 text fig.

It will probably surprise American readers of this paper that it should be necessary, at this date, to publish results demonstrating the efficacy of screening for the reduction of malaria incidence. The method has long been practised by Americans to whom the unscreened houses of the British tropics are a source of amazement. The author's results are convincing and it is to be hoped that his paper may result in the widespread adoption of this plan in British possessions. The rationale of the proceeding is obvious when it is realized (as JAMES has pointed out) that for every million mosquito larvae, there are perhaps 50 adult mosquitoes sufficiently favourably placed to become transmitters; and screening effects its results "by protecting the men *absolutely* for the majority of the dangerous hours."

J. F. C. H.

NICHOLLS (L.). **The Organisation of Minor Anti-Anopheline Field Work.**—*Ceylon Jl. Sci.* (Sect. D. Med. Sci.) 1927. Mar. 16. Vol. 2. Pt. 1. pp. 31-36. With 1 map.

This paper cannot be summarized, but it contains useful details about the personnel necessary, the mapping of areas to be dealt with, the recording of work done and of results, and the general conduct of minor antimalarial operations.

J. F. C. H.

ROUBAUD (E.). L'hétérodynamie et le rôle de l'athermobiose dans le cycle évolutif de *Phlebotomus papatasi*. [**Heterodynamy and Athermobiosis in the Development of *P. papatasi*.**—*Bull. Soc. Path. Exot.* 1927. July 13. Vol. 20. No. 7. pp. 613-619. With 2 text figs. [3 refs.]

According to the observations described in this paper *Phlebotomus papatasi* is quite singular in being what the author calls "heterodynamous"—i.e., in producing at one birth eggs which, when left to hatch and to continue their ontogeny, *all of them under identical conditions*, give issue, some to larvae that complete their transformation to adults in less than a month, and others to larvae that pass into a state of suspended animation in their fourth stage and are unable to continue and complete their further transformations unless, sooner or later, they are resuscitated by an interval of exposure to a temperature 12° C. (or more) below their normal optimum of 28° C.

This "heterodynamy" appears to be a variable character: since of six female *P. papatasi* kept under observation by the author two individuals gave issue to larvae all of which, at 28° C., changed to adult insects within a month; three individuals gave issue to larvae all of which (at 28° C.) were still in their fourth, torpid, stage, at the end of four months; and one individual gave issue to larvae of which (at 28° C.) 5 were changed into adults in a month and the others after the lapse of four months are still in the fourth, inactive, stage.

In the laboratory the fourth (torpid) larval stage was observed to last at least five months in some cases; survivors then exposed for about a month to a temperature of 16° or 18° C. were resuscitated and completed their changes to adult insects after being returned to their optimum temperature of 28° C.

The fourth larval stage, of suspended animation, is termed by the author "asthenobiosis"; and what goes on in the resuscitative interval of exposure to lowered temperature is termed "athermobiosis."

A. A.

SULDEY (Ed. W.). *Stegomyia* et *Phlébotome* à Bamako (Soudan). [**Stegomyia and Phlebotomus at Bamako.**—*Bull. Soc. Path. Exot.* 1927. June 8. Vol. 20. No. 6. pp. 474-475. [1 ref.]

Since *Stegomyia* has been brought under complete control at Bamako in French West Africa, where—along with *Phlebotomus papatasi* and *minutus*—a non-eruptive form of dengue (not to be confused with papataci fever) exists, the author speculates on the possibility of *Phlebotomus* being a carrier of dengue fever.

A. A.

NITZULESCU (Virgil). Contribution à l'étude de la pompe salivaire des simuliés. [**The Salivary Pump of the Simuliidae.**—*Bull. Soc. Path. Exot.* 1927. Oct. 12. Vol. 20. No. 8. pp. 748-753. With 1 text fig. & 4 figs. on 2 plates. [Parasit. Lab., Faculty of Med., Paris.]

A minute description of the salivary pump of Simuliidae intended to be supplementary of that given by CORNWALL in Vol. X of the *Indian Journal of Medical Research* (p. 996). The small point emphasized by the author is that the salivary pump is entirely tubular and is situated chiefly under the hypopharynx, with which it is incorporated.

A. A.

TAO (Shan Ming). **A Comparative Study of the Early Larval Stages of Some Common Flies.**—*Amer. Jl. Hyg.* 1927. Nov. Vol. 7. No. 6. pp. 735-761. With 7 plates. [42 refs.] [Sch. of Hyg., Johns Hopkins Univ., Baltimore, Md.]

This is a rigorously descriptive paper, fully illustrated, and including keys for the identification of first and second larval stages of thirteen of the commonest cosmopolitan genera of calliphorid, muscid, anthomyid, and sarcophagid flies. The author claims that the generic discrimination of these flies is thus possible without any confirmation by rearing larvae to the adult stage.

KEYS TO SOME COMMON GENERA OF THE FAMILIES CALLIPHORIDAE,
MUSCIDAE, ANTHOMYIDAE, AND SARCOPHAGIDAE

First larval stage.

- | | |
|--|-----------------------|
| 1. Larvae of normal muscoid shape without processes or appendages | 2 |
| Larvae with processes or appendages | 13 |
| 2. Having more than six complete spinose rings | 3 |
| Having not more than one complete spinose ring | 10 |
| 3. Having complete spinose rings on all segments except the first and the last, either on anterior or on posterior edges ... | 4 |
| Not more than nine complete spinose rings, all on anterior edges of segments | 6 |
| 4. All the spines chitimized | 5 |
| Not all the spines chitimized | 9 |
| 5. Mandibular sclerites composed of two lateral hooks, no denticles | |
| Mandibular sclerites composed of one median hook and denticles | <i>Sarcophaga</i> |
| 6. Denticles composed of a group of tooth-like structures and a pair of long sclerites | <i>Calliphora</i> |
| Denticles composed of a group of tooth-like structures only ... | 7 |
| 7. Lateral plate of pharyngeal sclerites very narrow, anterior ends of hypostomal sclerites straight... .. | <i>Lucilia</i> |
| Lateral plate of pharyngeal sclerites broad, anterior ends of hypostomal sclerites bend sharply dorsally ... | <i>Protophormia</i> |
| Lateral plate of pharyngeal sclerites very broad, anterior ends of hypostomal sclerites straight | <i>Cochliomyia</i> |
| 8. Posterior end papillated, six tubercles on each lip | <i>Cynomyia</i> |
| Posterior end not papillated, no tubercles on upper lip, but four very small inconspicuous tubercles on lower lip... | <i>Phormia</i> |
| 9. A complete chitimized spinose ring at the middle of the eleventh and twelfth segments | <i>Pollcia</i> |
| 10. Posterior end round and smooth | <i>Musca</i> |
| Posterior end papillated | 11 |
| 11. Lateral plate of pharyngeal sclerites broader dorso-ventrally than antero-posteriorly | 12 |
| Lateral plate of pharyngeal sclerites broader antero-posteriorly than dorso-ventrally | <i>Stomoxys</i> |
| 12. Denticles around the mouth coarse | <i>Muscina</i> |
| No denticles around the mouth | <i>Ophyra</i> |
| 13. Posterior spiracles on a pair of short separated tubercles ... | 14 |
| 14. Appendages of spiniferous type | <i>F. canicularis</i> |
| Appendages of pinnate type | <i>F. scalaris</i> |

Second larval stage.

- | | |
|--|----|
| 1. Larvae of normal muscoid shape without processes or appendages | 2 |
| Larvae with processes or appendages | 11 |

2. Dorsal cornua of pharyngeal sclerites deeply incised posteriorly
Dorsal cornua of pharyngeal sclerites not incised ... *Sarcophaga* 3
3. Dorsal arch of pharyngeal sclerites porous and with uneven edges ... 7
Dorsal arch of pharyngeal sclerites not porous and with even edges ... 4
4. Complete spinose rings on posterior ends of segments 8-12 or 7-12 ... *Cynomyia, Calliphora*
Not more than 3 caudal segments with complete spinose rings 6
No complete spinose ring on posterior end of any segment ... 5
5. Posterior end non-papillated, some spines with swollen ring near the tip ... *Cochliomyia*
Posterior end papillated, spines without swollen ring near the tip ... *Phormia*
6. Posterior spiracles narrower transversely than longitudinally, the distance between the two spiracles greater than the width of one of the spiracles ... *Lucilia*
Posterior spiracles broader transversely than longitudinally, the distance between the two spiracles less than the width of one of the spiracles ... *Protophormia*
7. Posterior end smooth, rounded ... 8
Posterior end papillated or rough ... 9
8. Mandibular sclerites composed of three pairs of long, slender, hooked sclerites ... *Musca*
9. Lateral plates very broad; ventral cornua twice as long as dorsal cornua ... *Stomoxys*
Lateral plates narrow; ventral cornua slightly shorter than dorsal cornua ... 10
10. Lateral hooks bend ventrally at the posterior ends forming a right angle ... *Ophyra*
Lateral hooks formed by two long parallel sclerites with their posterior ends articulated to a short transverse sclerite *Muscina*
11. Posterior sclerites on a pair of short separate tubercles... 12
12. Appendages of spiniferous type ... *F. canicularis*
Appendages of pinnate type ... *F. scalaris*
A. A.

CHARRIER (H.). Note préliminaire sur les mouches de la région de Tanger. [The Flies of the Tangiers Region.]—*Bull. Soc. Path. Exot.* 1927. July 13. Vol. 20. No. 7. pp. 619-622. [2 refs.] [Pasteur Inst., Tangiers.]

Along with some remarks on the deplorable insanitary conditions of Tangier this paper contains a list of 18 species of domestic muscoid flies, exclusive of the Calliphorids and Sarcophagids, that flourish there under those conditions.

A. A.

LAIDLER (P. W.). An Unusual Case of Myiasis in a European Male.—*Jl. Med. Assoc. S. Africa.* 1927. Sept. 10. Vol. 1. No. 17. p. 452.

The poor wretch in this case was one of the most deplorable objects to be seen in a land where tradition has hedged the white man with a sort of divinity among a native population—namely, a worn-out European tramp. He had found his way to a Salvation Army Hostel, only to pollute the air, and almost to choke pity, by the awful stench that presently was found to emanate from a leg exuding maggots. When hundreds of maggots had been cleared away their source was traced to three deep wounds in the shin; and all that could be elicited as to the origin of these wounds was

that, about a month previously, the man had felt some itching of the leg which he had sought to relieve by scratching. About 16 days after that, he had noticed a maggot, but without any concern then or afterwards; and he was the only person unperturbed by the pervading stench and by the seething mass of maggots exposed when his leg was bared. He "died as the result of his general condition four days later." The flies, bred from maggots by Mr. R. H. HARRIS, were identified by Mr. H. K. MUNRO as *Chrysomya chloropyga* and *C. marginalis*.

A. A.

KISLITSCHENKO (L.) & BARANOFF (N.). Fliegenmaden als Wundenscharotzer in Süd-Serbien (Mazedonien). [Fly Larvae as Wound Parasites in Macedonia.]—*Dermat. Woch.* 1927. Aug. 20. Vol. 85. No. 34. pp. 1169-1172. With 3 text figs. [5 refs.]

A case of extensive myiasis of the scalp by maggots of the Sarcophagid fly *Wohlfartia magnifica* is figured. Two other cases of surgical myiasis are mentioned in one of which the maggots were those of *Lucilia sericata*, in the other both *W. magnifica* and *L. sericata*. The hypopygium in both species of flies is figured.

A. A.

COMER (M. C.). Report of Six Unusual Cases.—*Southwestern Med.* 1927. July. Vol. 11. No. 7. pp. 308-312. With 2 text figs. [5 refs.]

Case No. I. Screw-Worm Infestation of the Nares. A workman asleep in the open during the mid-day dinner-hour was awakened by a violent fit of sneezing. Next day he went to hospital complaining of blocking of the nostrils and intense frontal headache. There was also a foetid sero-sanguinolent discharge from the nose, and maggots could be made out. Chloroform on cottonwool was applied to the nostrils and 130 screw-worms were removed at once; 45 more came away during the next 3 or 4 days. The maggots had already eaten through the nasal septum. The nasal cavity was irrigated with potassium-permanganate solution, and the patient discharged at the end of another week.

A. A.

STROUD (R. J.). Myiasis in the Southwest, with Particular Reference to the Species *Chrysomya macellaria*.—*Southwestern Med.* 1927. July. Vol. 11. No. 7. pp. 313-316. With 3 text figs. [8 refs.]

In the course of 13 years the author has had to treat 16 cases of myiasis due mostly to "screwworm" (*Chrysomya macellaria*); 14 were nasal, and in Mexicans, whose habit it is to sleep in the open and often in the daytime; one of these was fatal, by meningitis. The author emphasizes the necessity of early diagnosis, because the eggs hatch and the maggots grow very quickly; the evil stench is diagnostic, apart from the detection of maggots. His treatment is by chloroform douches, followed by simple douches and the use of forceps, and then leaving the nostrils plugged for a time with cotton-wool impregnated with chloroform; he states that carbon tetrachloride is just as effective, and he recommends it for children.

In an ensuing discussion all the speakers commented on the neglect of this subject in the standard text-books. One speaker mentioned 23 cases, with 4 fatalities, collected by him; another suggested suction apparatus for removal of maggots; another stated—in terms not so

entirely perspicuous as to be obviously relevant—that during the war, although there were many cases of gas-gangrene among the wounded not one was observed in any “patient who was infected with worms.”

A. A.

FALCÃO (Edgard de Cerqueira). Myiase palpebral determinada pela “*Dermatobia cyaniventris*” Macquart, 1840. [**Palpebral Myiasis caused by *Dermatobia cyaniventris*.**]—*Brasil-Médico*. 1927. Oct. 1. Vol. 41. No. 40. pp. 1038–1042. [9 refs.]

Case of ptosis and swelling of the right eyelid which had started with itching and pain some three weeks previously. Incision evacuated a larva of *Dermatobia cyaniventris*. The wound was treated and healed in 10 days.

H. Harold Scott.

RENNIE (John). **A Case of Intestinal Myiasis in a Breast-Fed Infant.**—*Parasitology*. 1927. Aug. Vol. 19. No. 2. pp. 139–140. [6 refs.] [Univ. Aberdeen.]

In this case “a fair number” of last-stage larvae of *Musca domestica* were found, incorporated with faeces passed on its napkin by a four-months-old infant that, except for sugar given on a teat, was fed at the breast. A fresh napkin had been affixed about half-an-hour before the observation was made, and the observer’s attention was attracted by the infant’s outcry. There had been no earlier indication of gastro-intestinal trouble. The infant was “but moderately clean” and at times had an offensive odour. “The dwelling was most insanitary.” Though it was winter (8th Feb.) and so far north as Aberdeen, flies were numerous in the rooms.

A. A.

NIESCHULZ (Otto). Ueber die Lebensdauer der Tabaniden. (Zoologische Beiträge zum Surraproblem Nr. XII.) [**The Life-Span of Tabanidae.**]—*Cent. f. Bakt.* I. Abt. Orig. 1927. Sept. 10. Vol. 103. No. 6-8. pp. 421–423. [Veter. State Inst., Buitenzorg, Java.]

In the course of surra experiments with *Tabanus rubidus* and *striatus* reared in the laboratory the author observed that adult females could live in captivity for more than 70 days, sucking blood under unrestricted opportunity about every two days.

A. A.

LLOYD (Llewellyn). **Report of the Tsetse Investigation, 1926.**—*Ann. Med. & San. Rep. Nigeria*. 1926. Appendix C. pp. 176–184. With 6 figs. on 2 plates.

This report has already been noticed here (Vol. 24, p. 891). It recounts: (1) an experiment in excluding game from a good “secondary focus” of *morsitans* and *tachinoides*; (2) an observation of the results of “late” grass-burning, and (3) the beginnings of an experiment in clearing and settlement.

The exclusion of game was followed by a local decrease in the numbers of tsetse-flies, not so much in *tachinoides* as in *morsitans*, since the former feeds well on reptiles which are not easy to exclude. The late grass-burning was followed immediately by a great mortality of flies (both adults and pupae) but the numbers soon began to increase again by immigration. In clearing, the main breeding-foci whence the fly spread abroad during the rains are being attacked. The report contains some very nice photographs.

A. A.

SCHWETZ (J.). Notes sur la répartition actuelle (en 1925 et 1926) des glossines dans plusieurs régions du Katanga. [**Notes on the Distribution of Tsetse in Districts of the Katanga.**]—*Ann. Soc. Belge de Méd. Trop.* 1927. Nov. Vol. 7. No. 2. pp. 111–134. With 1 folding map. [10 refs.]

The general distribution of tsetse-flies in Katanga is well known; but the present paper with all its discriminative local particularities has still some lessons of general interest. The chief object lesson is the retreat of fly before the hurlyburly innovations of European settlement—the clearing of land, and the smoke and noisy traffic that drives the big game away. *Glossina morsitans* is not now to be seen within a radius of 30 kilometres from Elizabethville (and is practically extinct along the entire route from that town to Likasi) and the nearest approaches of *G. palpalis* are at 110 to 150 kilometres. The same pushing away of the fly is noticed roundabout other townships—Likasi, Kambove, and Albertville. The author greatly emphasizes the effects of disappearance of big game.

A. A.

JOHNSON (W. B.) & RAWSON (P. H.). **Use of the Precipitin Test to determine the Food Supply of Tsetse Flies: a Preliminary Note.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1927. Aug. 31. Vol. 21. No. 2. pp. 135–149. [4 refs.]

The authors attempted the work here recorded in a bush laboratory, and found it difficult to prepare and to keep their antisera without ice. They did, however, make some interesting tests. As they found that the average quantity of 1/500 serum-dilution available from a single tsetsefly-stomach is only 3 cc. which, using 0.3 cc. for each test (and for 1 control), is only sufficient to put up against 9 antisera, they devised a plan for limiting the number of antisera against which each blood had to be tested, by first determining whether the blood belonged to the small-erythrocyte group (which includes ruminants and wild cats) or the large-erythrocyte group (which includes man and a variety of non-ruminants). In one series of tests 8 *G. tachinoides* and 7 *G. morsitans* containing blood of the large-erythrocyte type were tested against conformable antisera: of the *G. tachinoides*, 6 gave a positive reaction for man, 1 for hyaena, and 1 for rodent; and of the *G. morsitans*, 5 gave a positive for man, and 2 were negative for all the antisera (man, monkey, donkey, jackal, hyaena, warthog, rat and hedgehog). In another series of tests of 679 *G. tachinoides* examined, 1.5 per cent. were positive for man, 2.5 per cent. positive for baboon, and 0.3 per cent. positive for monkey; and of 2,408 *G. morsitans*, 0.4 were positive for man, and 0.3 positive for baboon. It is thus shown that a large number of baboons in a locality assures the food-supply both of *tachinoides* and of *morsitans*.

The authors conclude that since blood taken from a fly's stomach on a strip of filter-paper keeps good for a long time, it should in this way be collected in the field and afterwards tested in a properly equipped laboratory where antisera can be prepared and stored. [This is also the experience of BULL and KING, with whose work on the use of the precipitin test for discriminating the blood in anopheline stomachs (*American Journal of Hygiene*, September, 1923, pp. 491–496; v. this *Bulletin*, Vol. 21, p. 143), the authors appear to be unacquainted.]

A. A.

JORGE (Ricardo). Les faunes régionales des rongeurs et des puces dans leurs rapports avec la peste. [**Regional Faunas of Rodents and Fleas in their Relation to Plague.**].—*Bull. Office Internat. d' Hyg. Publique*. 1927. Aug. & Sept. Vol. 19. Nos. 8 & 9. pp. 1094–1109; 1257–1288. [3 refs.]

This convenient compilation is an abridgement and abstract of the authentic knowledge accumulated in various countries, in recent times, of specific rodents and rodent-fleas in so far as they are identified with the maintenance of plague as a regional enzootic or obscure endemic disease and with the distant carriage of plague and its discrimination in epizootics, culminating in epidemics, in populous centres. In the author's words, it is "an essay on rodentology and pulicology for the use of those who are concerned in pestology."

A. A.

CLARK (Taliaferro). La faune des rongeurs et de leurs parasites cutanés qui interviennent dans la propagation de la peste. [**Rodents and their Plague-carrying Skin Parasites.**].—*Bull. Office Internat. d' Hyg. Publique*. 1927. Aug. Vol. 19. No. 8. pp. 1129–1132.

This note deals with the general principles of plague quarantine so far as rat-fleas are concerned. It also states that the Public Health Service of the U.S.A. continued the survey of the rat-fleas of the port of New York begun in 1925. In 1926 the number of fleas taken from 12,808 dead rats was 6,274, of which 5,521 were *Xenopsylla cheopis*; 4 *X. brasiliensis*; 27 *X. astia*; 653 *Ceratophyllus fasciatus*; 54 *Leptopsylla musculi*; 9 *Ctenocephalus canis* or *felis*; 1 *Pulex irritans*; and 5 not identified.

A. A.

SINTON (J. A.). **The Indian Rat Fleas, with Special Reference to the Identification of the "Plague Fleas."**—*Indian Jl. Med. Res.* 1925. Jan. Vol. 12. No. 3. pp. 471–478. With 15 figs. on 2 plates. [5 refs.]

This useful compilation contains keys for the discrimination of genera and certain important species of rat-fleas, and an account of CRAGG's ways of collecting and mounting fleas.

A. A.

MITAL (B. P.). Sur la distribution géographique et la prévalence saisonnière des rats et puces de rats dans les Provinces-Unies. [**Geographical Distribution and Seasonal Prevalence of Rats and Rat Fleas in the United Provinces.**].—*Bull. Office Internat. d' Hyg. Publique*. 1927. Aug. Vol. 19. No. 8. pp. 1110–1128.

This report represents the results of a year's survey. The number of fleas collected (from 2,558 rats) was 15,118. The species of fleas were *Xenopsylla astia*, 53·5 per cent. of the total, *X. cheopis* 42·3 per cent., *Ceratophyllus* 3·5 per cent., and severally in small number *Ctenocephalus canis* and *felis*, *Pulex irritans*, *Ctenopsylla* and *Hoplopsyllus*. *X. astia* (rare in hilly tracts) was taken in increased numbers in April, June, and September. *X. cheopis* was most abundant during the rainy season.

Ceratophyllus was found most in the western districts of the United Provinces. A tabular statement shows the percentages of the several species of fleas collected in 48 large towns along with the intensity of plague for 23 years in each of those towns. The results of the survey do not altogether confirm the theory that liability to epidemics of plague depends on predominance of *X. cheopis*; the author mentions several districts—including Kumaon, Dehra Dun, Philibit—which have been little troubled by plague although *X. cheopis* is the predominant species; and he contrasts Gorakhpur, with its 71.2 per cent. of *X. cheopis* and its 2.12 per mille plague mortality (for 23 years) with Ballia where the percentage of *X. cheopis* was 68.2 and the plague mortality (23 years) was 12.52 per mille.

A. A.

BARRAUD (P. J.). **A Note on Rat Fleas collected in Assam.**—*Indian Jl. Med. Res.* 1927. Oct. Vol. 15. No. 2. pp. 519–521. [4 refs.] [Central Research Inst., Kasauli, India.]

In a by-path from other cognate work the author collected 153 fleas from 17 rats in Gauhati and obtained otherwise 62 rat-fleas from Shillong; all of them but one were *Xenopsylla cheopis*, the solitary exception (in Gauhati) being *X. astia*.

A. A.

IOFF (I.). **Materialen zum Studium der Ektoparasitenfauna im S.-O. Russlands. IV. Flöhe der Murmeltiere (Marmota) und der Gelbziegel (Citellus fulvus).** [**Marmot and Ziesel Fleas.**]—*Rev. Microbiol. et Epidémiol.* 1927. Vol. 6. No. 3. German summary pp. 378–380. [In Russian pp. 316–323. With 3 text figs. 13 refs.]

An entomological paper containing notes and figures of male genitalia of 2 spp. of *Oropsylla* from marmot and ground-squirrel respectively, and mention of five other spp. of fleas taken from other local rodents.

A. A.

NITZULESCU (Virgil). **Sur le stylet médian de l'appareil buccal de la puce.** [**The Median Stylet of the Buccal Apparatus of the Flea.**]—*Bull. Soc. Path. Exot.* 1927. June 8. Vol. 20. No. 6. pp. 467–473. With 3 text figs. [13 refs.]

From longitudinal and serial sections the author concludes that the median stylet of the proboscis of the flea is the epipharynx; its canal is closed distally. Saliva is introduced by the mandibles.

A. A.

PERFILEW (P.). **Zur Anatomie der Flohlarven.** [**Anatomy of Flea Larvae.**]—*Rev. Microbiol. et Epidémiol.* 1927. Vol. 6. No. 3. German summary p. 381. [In Russian pp. 329–341. With 20 text figs. 13 refs.]

Merely describes the mouth-parts and (with figures) the anatomy, as studied in sections, of the flea larva as exemplified in *Leptopsylla pavlovskii*: nothing novel.

A. A.

KELSALL (R.). **A Case of sweating Blood.** With Note by Major G. G. JOLLY.—*Indian Med. Gaz.* 1927. Oct. Vol. 62. No. 10. pp. 565-566. [1 ref.] [Rangoon General Hosp.]

The "sweating" of blood in this case was found to be due to the Sarcopsyllid flea *Echidnophaga gallinacea*. The patient, a Mahomedan lady, was tenderly attached to some chickens, which she was accustomed to cherish in her bosom; the chickens were infested with these fleas, and some of the fleas transferred their attention to the lady.

A. A.

PAVLOWSKY (E. N.) & STEIN (A. K.). Altérations pathologiques de la peau humaine déterminées par l'action des poils vénémeux de la chenille hibernante d'*Euproctis chrysorrhoea*. [**Pathological Changes in the Human Skin from the Action of Poisonous Hairs of *E. chrysorrhoea* Larva.**—*Russian Jl. Trop. Med.* 1927. Vol. 5. No. 7. French summary pp. 469-470. [In Russian pp. 445-448.]

According to the French summary the irritant hairs of the caterpillar of *Euproctis chrysorrhoea* cause a local inflammatory oedema with points of inflammatory infiltration where the hairs penetrate the skin.

A. A.

DALLAS (E. D.). Eritema generalizado producido por un lepidóptero. [**Generalized Erythema produced by a Lepidopteron.**—*Semana Méd.* 1927. Mar. 24. Vol. 34. No. 12 (1732). p. 760. With 1 text fig.

A woman of 25 years felt a sudden burning sensation on the right arm and saw a "small dark insect" which she brushed off without further attention; after a few minutes itching, an erythematous morbilliform eruption appeared and spread rapidly up the arm and over the thorax and abdomen. There were no other symptoms of any sort. The insect proved to be *Hylesia nigricans*, the larva of which is the "bicho quemador" ("burning grub").

H. Harold Scott.

MAZZA (Salvador). Necrosis considerable producida por picadura de araña migalomorfa. [**Extensive Necrosis from the Bite of an Arachnid.**—*Bol. Inst. Clin. Quirurg.* Buenos Aires. 1927. Vol. 3. Nos. 21-25. pp. 767-769. With 1 text fig. [3 refs.] [Also issued as 3^a Reunión, Soc. Argentina Patol. Regional del Norte, Tucumán, Julio, 7, 8 y 10, 1927. pp. 659-661 & illustration.]

The spider in question is said to be a "veritable giant among Arachnida"; some admit that its poison is very potent for reptiles and batrachia, but debate its effect on mammalia. The patient here was seen ten days after the infliction of the bite, now indicated by a large black eschar in a carbuncle, the whole as "large as the head of an adult man." Treatment (with aristol) left a cavity the size of a goose egg. The general state of the patient was not, strange to say, disturbed. If treated early, a specific antiserum is said to be very efficacious.

H. Harold Scott.

DUNN (Lawrence H.). **Studies on the South American Tick, *Ornithodoros venezuelensis* Brumpt, in Colombia. Its Prevalence, Distribution, and Importance as an Intermediate Host of Relapsing Fever.**—*Jl. Parasit.* 1927. June. Vol. 13. No. 4. pp. 249–255. [International Health Board, New York.]

Ornithodoros venezuelensis is a common house-tick of Colombia; no less than 4,880 were collected in sixty-eight houses in different villages and towns of that country. Of sixty-one lots of ticks, 27·86 per cent. of the individual ticks, representative of seventeen houses in seven different localities, were found to be infested with the spirochaetes of relapsing fever. Three lots of ticks, kept closely confined without nourishment, were potentially infective at the end of 172 days.

A. A.

PAWLOWSKY (E. N.) & STEIN (A. K.). Experimentelle Untersuchungen ueber die Wirkung von *Ixodes ricinus* (Ixodidae) auf die Menschenhaut. [**Experimental Investigation of the Action of *I. ricinus* on the Human Skin.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1927. Dec. Vol. 31. No. 12. pp. 574–586. With 8 text figs. [19 refs.]

The anatomy of the salivary glands of the tick is figured and is described in much detail. Results of experiments with emulsions of them, and also of the stomach and rectum, are tabulated; the salivary secretion alone caused a pustule on the skin; the other organs merely provoked varying, non-specific, inflammatory phenomena. In the saliva, besides the anticoagulin, there is a strongly specific toxin, and the authors think it probable that the virulence of this toxin varies in the different stages, and at different times in each stage, of the tick's development.

A. A.

KING (Harold H.). **The Ticks (Ixodoidea) of the Sudan.**—*Sudan Government. Wellcome Tropical Research Laboratories. Entomological Section Bull. No. 23.* 1926. Dec. 15 pp. With 1 map & 20 figs. on 1 folding plate.

This useful pamphlet is compiled for the benefit of local officials who wish to identify the local ticks.

A. A.

GOUGH (L. H.). **Key to Identification of Egyptian Scorpions.** With Notes and Additions by HIRST (Stanley).—*Ministry of Agric. Egypt. Technical & Scientific Service. (Plant Protection Section, Entomological Res. Division). Bull. No. 76.* 7 pp. With 9 figs. 1927. Cairo: Govt. Press. [P.T. 5.]

This pamphlet, which can be obtained from the Government Publications office, Ministry of Finance, Dawāwin P.O., Cairo, contains a key for the identification of the scorpions (14 species) recorded from Egypt. The key is conveniently based on characters of the poison-sting and the segment immediately preceding it. With these parts, properly sun-dried, the production of accurately specific antisera can be achieved with a minimum difficulty of transport, etc., in the case of Egyptian scorpions.

A. A.

KOPSTEIN (F.). **The Poisonousness of the Javanese Giant Scorpion** *Heterometrus cyaneus*.—*Meded. Dienst d. Volksgezondheid in Nederl.-Indië*. 1927. Part 3. pp. 504–513.

This paper describes some simple experiments with the venom of the large Oriental scorpion *Heterometrus cyaneus*. Small birds (Java sparrows and weaver-birds) were fatally convulsed, and insects and earthworms and a small gecko were fatally paralysed; but to mammals even so small as rats the venom of a single scorpion did not cause much distress, or much injury except in some rats occasionally a necrosis at the site of injection. Frogs, a toad, a tortoise, and a venomous snake (*Bungarus candidus*) appeared quite immune, as did the specific scorpion itself. The toxic property is almost entirely destroyed by heating to 50° C. for 5 minutes.

A. A.

SAGREDO (N.). *Linguatula-rhinaria*-Larva (*Pentastoma denticulatum*) in den Lungen des Menschen. [**Larvae of *P. denticulatum* in Human Lung.**—*Virchows Arch. f. Path. Anat. u. Physiol.* 1924. Vol. 251. pp. 608–615. With 4 text figs. (1 coloured). [20 refs.]

The point of this long story is that few observers have encountered the larva of *Pentastoma denticulatum* in the human lung and none have discovered its pathological significance for man. The author however, in the course of a post-mortem examination (on a fatal case of encephalitis lethargica) observed this larva in a fresh haemorrhagic infarct of the lung—the lungs being otherwise normal. He describes and figures this infarct and the larva and concludes that the latter is undoubtedly pathogenous.

A. A.

SONOBE (Koichi). Ueber Linguatuliden-Larven-Knötchen (sog. Pentastomen-Knötchen) der Leber des Menschen. Nebst Bemerkungen zu der Veröffentlichung von N. Sagredo in Bd. 251 Virchows Archivs. [**On Linguatulid-Larval-Nodules (so called Pentastoma Nodules) of the Liver in Man.**—*Sei-I-Kwai Med. Jl.* 1927. July. Vol. 46. No. 7. pp. 1–13. [31 refs.] [Municipal Urban Hosp., Berlin.]

With reference to SAGREDO's conclusions this author states that in the course of 500 post-mortem examinations in Berlin he observed the larva of *Linguatula rhinaria* (= *Pentastoma denticulatum*) in the liver in 16 instances. In every case the larva was encysted, dead, and calcified. For man this larva has no pathological import.

In feeding experiments with white mice in S. America the author noted the death of the mice 29 to 64 days after eating eggs from Linguatulids of snakes. The usual cause of death was haemorrhage into the thoracic or the abdominal cavity, where also the free Linguatulid larvae could be found. The larvae were present oftenest in the lungs, then in the parietal peritoneum, mesentery, liver, spleen, and kidneys—in that order.

[Hospital cases of death consequent on heavy infestation of the viscera with larvae of *Porocephalus* have been reported from French West Africa—*vide* this *Bulletin*, Vol. 20, p. 418.]

A. A.

FAUST (Ernest Carroll). **Linguatulids (Order Acarina) from Man and Other Hosts in China.**—*Amer. Jl. Trop. Med.* 1927. Sept. Vol. 7. No. 5. pp. 311-325. With 1 text fig. & 14 figs. on 2 plates. [13 refs.] [Peking Union Med. College, Peking, China.]

Four species are included in this paper, all being represented by nymphs—namely, *Armillifer moniliformis*, from liver of man; *Linguatula serrata*, from lung of rabbits; *Kiricephalus pattoni*, from lung of cat; and *Reighardia sternae* from the lung and portal blood of a tern.

A. A.

HANSEN (I.). [A Case of "Larva Migrans."]—*Ugeskrift f. Laeger.* Copenhagen. 1927. Apr. 14. Vol. 89. p. 298. [Summarized in *Jl. Amer. Med. Assoc.* 1927. July 23. Vol. 89. No. 4. p. 334.]

This case affected the ankle of a Siamese woman. The only specific detail here given is that the track of the larva, which was marked by discolouration of the skin, advanced "several centimetres" a day.

A. A.

CILENTO (R. W.). **Larva Migrans (*Myiasis linearis*) occurring in the Territory of New Guinea.**—*Med. Jl. Australia.* 1927. Oct. 29. 14th Year. Vol. 2. No. 18. pp. 614-615. With 1 text fig.

Larva migrans, or "creeping eruption," is known to be a vague term for a phenomenon of varied causation. In the present novel case—a young European child in New Guinea—the eruption appears to have been caused by a mite, or mites, of the genus *Rhizoglyphus*—mites that burrow in roots and bulbs.

A. A.

BULLETIN OF THE ANTIVENIN INSTITUTE OF AMERICA. Philadelphia, Pa., 1927. Mar. & July. Vol. 1. Nos. 1 & 2.

These two initiative numbers of the *Bulletin of the Antivenin Institute of America* contain two compilations of a semi-popular kind on the poisonous snakes of the U.S.A., two articles on the well-known principles of treatment of snake-bite, some brief abstracts of cases of snake-bite treated with antiotheric serum in hospitals of the United Fruit Company, and numerous articles—descriptive and taxonomic—that are of interest only to those who have to deal with systematic herpetology. A short article by P. J. DARLINGTON states that the colubrine snake *Tropidophis semicinctus*, when offended, emits a very offensive fluid from the cloacal orifice and at the same time exudes blood from the mouth.

The editors' statement, that the subject-matter of their new Bulletin is of a kind that hitherto has received little attention within their own geographical range, will cause surprise to those who remember that the classical studies of WEIR MITCHELL and of SEWALL on rattlesnake venom, were the starting-points of our knowledge, respectively, of snake-toxins and the acquisition of immunity to them.

A. A.

NECHKOVITCH (Miloutine). Action du venin de cobra sur les animaux en état d'hypoglycémie insulinaire. [**Action of Cobra Venom on Animals Hypoglycaemic from Insulin.**].—*C.R. Soc. Biol.* 1927. Nov. 11. Vol. 97. No. 30. pp. 1304–1305. [1 ref.] [Physiol. Inst., Faculty of Med., Belgrade.]

Experimenting with rabbits the author finds that the neurotoxic (paralysing) action of cobra venom is not affected by a state of hypoglycaemia. In this respect cobra-neurotoxin differs from curari, a lethal dose of which falls short of its effect in a hypoglycaemic rabbit.

A. A.

CARMICHAEL (Emmett B.). **Detoxification of Rattlesnake Venom by Sodium Ricinoleate.**—*Jl. Pharm. & Experim. Therap.* 1927. Oct. Vol. 31. No. 6. pp. 445–454. [7 refs.] [College of Med., Univ. of Cincinnati, Ohio.]

The author recounts in very full technical detail the experimental evidence that rattlesnake venom subsequent to admixture with sodium ricinoleate can be injected into a rabbit in estimated lethal doses without causing death; and he also states that an aqueous solution of 0.15 gm. of sodium ricinoleate if injected into a rabbit, within about 30 seconds—and at the identical spot—subsequent to a lethal dose of rattlesnake venom, can save the animal at the price of a local ulcer.

A. A.

MUCH, PEEMÖLLER & HAIM. Lichtwirkung und Kobragift. [**Action of Light on Cobra Venom.**].—*Muench. Med. Woch.* 1927. Aug. 12. Vol. 74. No. 32. pp. 1365–1366. [Immunol. Inst., Univ., Hamburg & Light Research Inst. Hamburg, Eppendorf.]

This paper concerns the question whether various radiations are able to alter the activity of a reagent or the response of a reacting body.

HAIM and ISMET, in 1924, observed that the radiation of lipoids increased their power as antigenic substances and the fact that different kinds of radiation have different effects suggested a means for the measurement of the biological activity of X-rays.

Lipoids have an important significance in vital processes. Their function in the haemolysis of red blood corpuscles by cobra venom led to the use of this reaction as a method for assessing the effect of light on the haemolytic power of the venom. The authors found that it is possible to destroy this power totally by the light of the mercury vapour lamp. The cobra venom was used in a dilution of 1:2000; placed within an ice-cooled quartz vessel it was exposed to the lamp at a distance of half a metre to a dose equivalent to 72 times that required to cause erythema of the skin. Such irradiated venom failed to induce haemolysis.

Further work is promised upon the effect of radiated and un-irradiated lecithin and cholesterin upon the biological effects of venom solutions. The authors have also shown that the toxicity of cobra-venom to white mice is cancelled by radiation and foresee a method of prophylaxis by treatment with snake poison whose activity has been reduced by radiation and perhaps combined with irradiated lipoids such as cholesterin or lecithin.

R. G. Bannerman.

MACINNES (A.); PERN (Sydney); MACPHERSON (John); PALMER (Arthur). **Snake Bite.** [Correspondence.]—*Med. Jl. Australia.* 1927. July 2. 14th Year. Vol. 2. No. 1. pp. 33-35.

This correspondence about snake-bite and its treatment, which for some months past has been carried on in the *Medical Journal of Australia*, for the most part with pathetic indifference to the existence of the large body of exact knowledge—a veritable canon—of that subject, is here appropriately concluded by a critical letter from Dr. Arthur PALMER, who states his opinion that even the fine experimental work of C. J. MARTIN and F. TIDSWELL on the venomous snakes of *Australia* "is not well enough known to medical men."

A. A.

OTTO (R.). Zur Serumtherapie bei Bissen durch europäische Vipern. [**Serum Therapy of Bites of European Vipers.**]—*Klin. Woch.* 1927. Oct. 8. Vol. 6. No. 41. pp. 1948-1950. ["Robert Koch" Inst., Berlin.]

The statements of KRAUS (and others) as to the potency of South American *Lachesis jararaca* antivenom and antithropserum to neutralize the venom of the European viper have induced the author to study the influence upon European viper-venom of Oriental polyvalent antivenom elaborated in Java; this he finds to be very slight.

A. A.

SORDELLI (A.) & PACELLA (G.). Quelques considérations sur le titrage du sérum anti-ophidien. [**Considerations on the Titration of Snake Antivenom.**]—*C.R. Soc. Biol.* 1927. Nov. 4. Vol. 97. No. 29. pp. 1246-1248. [Bact. Inst. Dept. Nat. Hygiene, Buenos Aires.]

The exact experiments with different samples of venom of *Lachesis alternatus* here briefly described show that it requires different doses of the same identical antivenom to neutralize the minimum lethal dose of different individual venoms of that species. [Since it has long been known, in a general way, that the quality of the venom of an individual snake varies, like the quality of our own secretions, with circumstances organic, seasonal, and environmental, these exact observations through interesting are not astonishing]. The authors however, would impart materialistic exactitude to their results by supposing that each assumed toxic component of a snake's venom gives origin to a corresponding antitoxin, and that the several antitoxins exist in different concentrations in each antivenom. This latter hypothesis, however, is based on experiments where the neutralizing power of different specimens of antivenom upon different individual venoms is compared.

A. A.

CHODOUKINE (N. I.). Sur la biologie des anopheles hibernantes et sur son rôle dans l'épidémiologie et la lutte antipaludique au Turkestan.—*Russian Jl. Trop. Med.* 1927. Vol. 5. No. 8. French summary p. 534. [In Russian pp. 502-512. 9 refs.]

HEALTH BULLETIN, No. 13. MALARIA BUREAU No. 5. 15 pp. With 3 figs.—Instructions for Collecting and Forwarding Mosquitoes. 1927. Calcutta: Government of India Central Publication Branch.

- KOIDZUMI (M.). On the Distribution of Anophelines in Formosa.—*Taiwan Igakkai Zasshi* (*Jl. Med. Assoc. Formosa*). 1927. Nov. No. 272. English summary p. 1. [In Japanese.]
- KOIDZUMI (M.). Considerations on Practice of Antilarval Work for Prevention of Malaria in Formosa.—*Taiwan Igakkai Zasshi* (*Jl. Med. Assoc. Formosa*). 1927. Nov. No. 272. English summary p. 1. [In Japanese.]
- LIMA (A. da Costa). Sur la respiration des larves d'*Anopheles albimanus* Wied.—*C.R. Soc. Biol.* 1927. Oct. 21. Vol. 97. No. 27. pp. 1092-1093. ["Oswaldo Cruz" Inst., Rio de Janeiro.]
- MÉTELKINE (A.). Action du refroidissement, de la surfusion et de la congelation sur les trypanosomes.—*Russian Jl. Trop. Med.* 1927. Vol. 5. No. 8. French summary pp. 501-502. [In Russian pp. 487-501. 17 refs.]
- PETERMAN (M. G.). Pathogenic Giardiasis in Children.—*Jl. Lab. & Clin. Med.* 1927. Oct. Vol. 13. No. 1. pp. 75-76. [4 refs.] [Milwaukee Children's Hosp., Milwaukee, Wis.]
- PURI (I. M.). A Note on the Full-Grown Larvae of *Anopheles jamesii* Theobald, *A. fuliginosus* Giles, *A. pallidus* Theobald and *A. ramsayi* Covell (Culicidae, Diptera).—*Indian Jl. Med. Res.* 1927. Oct. Vol. 15. No. 2. pp. 511-517. With 19 figs. on 2 plates. [11 refs.] [Central Research Inst., Kasauli, India.]
- ROOT (Francis Metcalf). Studies on Brazilian Mosquitoes. III. The Genus *Culex*.—*Amer. Jl. Hyg.* 1927. Sept. Vol. 7. No. 5. pp. 574-598. With 24 figs. on 6 plates. [8 refs.]
- RUSSELL (Helen). Notes on the Reaction of the Breeding Places of Anophelines in Macedonia.—*Bull. Entom. Res.* 1927. Dec. Vol. 18. Pt. 2. pp. 155-158. With 1 map in text. [13 refs.]

LABORATORY REPORTS.

TANGANYIKA TERRITORY. Annual Report of the Bacteriological Laboratory at Dar Es Salaam for the Year ending 31st December 1925. [CORSON (J. F.).]—*Ann. Med. Rep. for the Year ending 31st December, 1925. Tanganyika Territory.* pp. 118-125.

The following items may be noticed. The prevalent malaria parasite is *P. falciparum*; the parasite-rate in children and adolescents appears to be fairly high all the year round. In 967 routine examinations of native faeces ankylostomes were found in 355 cases, and eggs of *Schistosoma mansoni* in 12. Urinary schistosomiasis is common, the incidence in school children in certain places being over 30 per cent. of those examined; in 72 routine examinations of native urines eggs of *S. haematobium* were observed in 30 cases. Search for the molluscan host of this species has not yet been successful, but *Isidora nasuta* has been observed in several places, and in it (in one locality) fork-tail cercariae devoid of "eye-spots." The microfilariae of both *F. bancrofti* and *F. perstans* are prevalent—especially near the big lakes; those of *bancrofti*, though in some cases abundant in the day time, have yet a well-marked periodicity. In routine examinations of 149 native sputa the tubercle bacillus occurred in 49 instances. Dead rats to the number of 22,768 were examined for plague—all in the negative. During the year 261,050 doses of calf-lymph were issued.

A. Alcock.

NIGERIA. Annual Report of the Medical Research Institute, 1926. [CONNAL (Andrew), Director.]—*Ann. Med. & San. Rep. Nigeria.* 1926. Appendix A. pp. 89-90.

The following items are taken verbatim from this admirably concise report :—

"The following subjects received particular attention:—Rat plague, yellow fever, prickly heat, tropical ulcer and markings on *Aedes argenteus*. Plague in rats was found to be still in an acute form, no evidence of chronicity having been obtained.

"There were further indications that yellow fever in West Africa is not identical with that disease in the Western Hemisphere.

"The cause of prickly heat is considered to be a fungus belonging to the genus *Monilia*.

"The main factor in the production of tropical ulcer is thought to be *Bacillus pyocyaneus*, of which organism a number of strains have been isolated.

"The markings of *Aedes argenteus* have been proved to be very variable and no reasons for the creation of new varieties have arisen.

"Other subjects dealt with are blackwater fever, malignant disease, black tongue, leprosy and mosquito-dissections.

"Those who suffered from blackwater fever have invariably shown a malarial history.

"Malignant disease has been shown to be by no means uncommon and the various forms of cancer to be not rare.

"'Black tongue' was investigated and found to be due to a fungus of the oidium type, occurring in cases of relapsing fever.

"Moogrol in the treatment of both early and late cases of the three forms of leprosy, continued to be of great use."

A. A.

NIGERIA. Annual Report on the African Hospital Laboratory, Lagos, 1926. [BUTLER (G. G.), Pathologist.]—*Ann. Med. & San. Rep. Nigeria*, 1926. Appendix B. pp. 147–175.

This report contains a wealth of classified detail which will be appreciated by pathologists. A large number of autopsies (256) have been studied with discrimination, and the results are set forth in twenty pages. Here are to be found interesting details of the observed weights of the viscera of Africa natives at different periods of life—a subject of novel attention. Causes of death are analysed at considerable length; post-mortem observations of 9 cases of malignant disease in natives are fully considered, as also of 5 cases of carbon-tetrachloride poisoning; and special attention is paid to 4 cases of Bilharzia infection with portal pyaemia and abscesses in kidney and spleen.

In the laboratory 3,874 blood-films, 1,081 specimens of faeces, 385 specimens of urine, and 447 specimens of sputa have been examined. Of 1,049 films of malaria-infected blood 89.5 per cent. were subtertian, 9.3 per cent. quartan, and only 1 per cent. tertian. Microfilaria were found in 3 per cent. of blood-films.

Of the 1,081 specimens of faeces 585 were native and 496 European. Among natives *Ascaris* was found in 59.2 per cent., *Ancylostoma* in 25.4 per cent., tapeworm in 7 cases, *Schistosoma* in 11 cases, and *Entamoeba histolytica* in 8.5 per cent. In Europeans 4.4 per cent. of specimens were infested with *E. histolytica*; and equally in both races the stools in the majority of these cases were merely loose with admixture of mucus.

Evidence of schistosomiasis was found in 15 per cent. of urines, and tubercle bacilli were present in 13.6 per cent. of 402 specimens of native sputa.

A. A.

UGANDA PROTECTORATE. Annual Report of the Bacteriological Department for the Year ended 31st December, 1926. [MARTIN (M.), Acting Director of Laboratory.]—12 pp. 1927. Entebbe: Govt. Printer. [Shs. 2.]

In the absence of Dr. H. L. DUKE, seconded to serve as the President of the International Sleeping Sickness Commission, the Bacteriological Laboratory has been directed by the Senior Assistant. The following items from the Report may be noted.

Schistosomiasis.—In an attempt to estimate the incidence of this infection stools were collected from the gaol and local hospitals and schools. In 640 such examined, eggs of *S. mansoni* were found in 6 cases and of *S. haematobium* in a single case.

Ankylostomiasis.—In a survey of this infection samples of faeces of 571 individuals from the same sources were examined, of which 75 per cent. were found with evidences of infection. In some cases the worms even when numerous were observed to be not causing much inconvenience to the host.

Pneumonia in white rats.—A heavy mortality among these useful animals was found to be due to acute broncho-pneumonia. The organisms isolated were a pneumococcus and a bacillus resembling *B. influenzae* in all respects, except that it was easily grown on ordinary media.

The report refers more than once to difficulties in maintaining constancy of culture-conditions and in preserving certain necessary ingredients of culture-media in Uganda, the causes of which are under investigation.

A. A.

SERGEANT (Edmond). Rapport sur le fonctionnement de l'Institut Pasteur d'Algérie en 1926. [**Report of the Pasteur Institute of Algeria, 1926.**—*Arch. Inst. Pasteur d'Algérie*. 1927. Mar. Vol. 5. No. 1. pp. 55-90. [54 refs.]]

The first half of this report is a summary of special research in the laboratory and the field. Experimental observations pursued during a term of three years on a local group of natives have demonstrated the efficacy of cinchonine and cinchonidine in small daily doses (0.2 to 0.4 gm.) upon malaria parasites and also on the enlarged spleen; and the regular administration of quinine as a prophylactic to the railway staff of malarious stations during a similar term has reduced the percentage of cases of malarial fever among the staff from 23.9 to 7.8—the epidemic incidence of malaria in Algiers generally has been little changed during the three years. Experimental usage of stovarsol in a particular district has kept down parasites in children, but only parasites of benign tertian; moreover, stovarsol, is too poisonous for use except in experienced hands. A case of natural infection of *Phlebotomus papatasi* with *Leishmania tropica* has been observed in Biskra; and statistics show the seasonal concurrence of oriental sore with the prevalence of the Phlebotomus. There has been a recrudescence of undulant fever in Oran, where 3.2 per cent. of the apparently healthy goats examined were found to harbour the micro-organism; several experiments justify the conclusion that sheep are immune to this infection. Experiments have shown that theileriasis of North Africa is an entirely different disease from theileriasis of South Africa (coast fever). The observation that a single intradermic injection of the second anthrax-vaccine imparts immediate immunity to local sheep and bovines has been confirmed. A very contagious anaemia of sheep, caused by a filterable virus, and unnoticed before 1924, appears to be analogous to pernicious anaemia of the horse. A sort of commensalism has been discovered between the barm of vinous fermentation and the *Drosophila* fly that spreads it; the adult fly disseminates the barm in its dejecta, and the larva of the fly is nourished in the fermenting must. The barm as spread by the fly, besides fermenting the must, also protects the ripe grape from mould. A statistical study shows *Taenia echinococcus* to be common only in certain parts of Algeria. A new blastomycosis of man, caused by *Cryptococcus montpellierii*, has been discovered. This part of the report concludes with some sensible remarks upon the hygiene of tropical countries, and upon acclimatization, the author emphasizing the view that since the term "acclimatization" includes two distinct concepts—namely, tolerance of a physical medium and control of a pathological environment—it is useless for any scientific discussion.

The second half of the report deals with administrative and other routine. Here we notice that of 1,530 persons who attended the anti-rabic department, 1,494 underwent the complete treatment, the

mortality being 1·3 per cent. ; and that antimalaria measures of some kind—antimosquito operations of different sorts and regular quininization—were carried out in 56 localities.

A. A.

BOMBAY. Report of the Haffkine Institute for the Year 1925.
[MORISON, J., Offg. Director.]—32 pp. With 1 chart. 1926.
Bombay: Govt. Central Press. [As. 15 or 1s. 7d.]

“ Haffkine Institute ” is the distinctive appellation that has now been honourably awarded to the Bombay Bacteriological Laboratory by the Presidency Government.

The report for the year 1925 states that Haffkine's antiplague vaccine is becoming popular—a striking reversal of Indian sentiment. No less than 642,370 rats were sent by the Bombay Municipality for examination for plague, and the results with their relation to plague in the city are tabulated. Experiments for improving the antiplague vaccine have been continued. In the course of experimentation it was realized that the standardization of all brews by testing them first on rats was “ a notable advance ” ; also that although the vaccine is at its best within six months of manufacture, it is hardly less efficient during the following six months and is still potent for a further six months. Controlled experiments with 282 rats and 60 rabbits led to the conclusion that mercurochrome treatment had no influence on the course of plague. In discussing the transmission of plague by *Xenopsylla cheopis* and *astia* the difficulties of carrying out accurate experiments are described—difficulties in identification of the live flea ; in completely ridding a rat of fleas without apparent injury to the rat ; and in variously operative seasonal conditions.

The antirabic section, in this its fourth year, has continued to expand, 4,381 persons having received treatment from the Institute. Of 625 persons treated in Bombay city 0·96 per cent. were classed as failures, and of 3,756 treated at out-stations 0·48 are so estimated. Of 122 Bombay dog-brains examined, Negri bodies were present in 79 ; of 92 dog-brains from out-stations 67 were proved to be rabid.

The study of the pathology of the *Schistosoma spindalis* found in goats and cattle in India was continued by Dr. FAIRLEY, who considers the species to be closely allied, from the pathological standpoint, to *S. mansoni* and *japonicum*. A hookworm survey of 1,937 prisoners of Umarkhadi jail shows a maximum of infection in the rainy month of August and a minimum in the dry month of April.

In the biochemical section, which now is fully equipped, the subjects of special investigation were sprue and the chemical aspects of the growth of plague in broth media.

In the report on indigenous drugs it is stated on the authority of Dr. MHASKAR that *Nyctanthes arbor-tristis* in doses of 20–60 grains of leaf brought “ down the temperature to normal in all of 19 cases of malaria.”

Dr. Margaret BALFOUR in her studies of the subject has found that an important cause of maternal mortality, in Bombay, is a severe anaemia coming on during the last five months of pregnancy.

Miss MEHTA's survey of the natural agglutinations of the blood in Parsis included 1,000 individuals believed to be pure-bred in descent from the original Persian emigrants of the seventh century. The

following is the result of the survey stated in Janski terms :—Group I, 37·9 ; Group II, 20·0 ; Group III, 35·7 ; Group IV, 6·4. The ratio of agglutination-factors A/B (racial index) is 0·63.

Miss Mehta has made a further interesting observation. Among the Parsis the priests form a community the members of which until the last thirty or forty years did not intermarry with members of the lay community. In three such unrelated families the heads . . . on both the father's and the mother's side and all their immediate progeny belong to Group I. Any descendants in the 3th and 4th generations that do not belong to Group I, in so far as Dr. Mehta's investigation has gone, are the result of an inter-marriage with a member of the lay community."

A. A.

BOMBAY. Report of the Haffkine Institute for the Year 1926. [MACKIE (F. P.), Director.]—25 pp. With 2 charts. 1927. Bombay : Govt. Central Press. [Ann. 8 or 10d.]

Of plague-prophylactic $2\frac{1}{2}$ million doses were issued during the year, the blunt monster with the uncounted heads having completely reversed its appetite, and being now disposed to clamour if the supply runs short and to murmur if inoculation be not followed by a smart reaction. All brews are stringently tested for toxicity and for efficiency, before issue, since the immunizing power is so variable. Experiments seem to indicate that a culture of plague bacillus on casein-broth yields a vaccine of higher potency. In an investigation of the pesticidal power of the common phenols and some of their derivatives (116 drugs in all) it was found that their effects *in vivo* did not always correspond with their test-tube value. Experiments for the isolation of a bacteriophage *apud* d'Herelle from infected rats did not yield a potent bacteriophage ; and a deputation sent to study the therapeutic value of d'Herelle's pestiphage in plague-patients at Hyderabad (Deccan) and Agra did not observe any influence on the course or mortality of the disease either by its intravenous or intrabubonic injection, or by both methods combined. Professor D'HERELLE who instituted some operations in the laboratory has been officially invited to return and resume his work on the bacteriophage treatment of plague, cholera, and dysentery.

Of applicants for antirabic treatment 648 underwent the full course at the Institute, of whom 1 died within 15 days and 4 more died more than 15 days after completion of treatment. Means of treatment for many hundreds of other patients were sent out to many places in other parts of India. Much stress is now laid by Assistant Surgeon Le FRENAYS on preliminary cleansing of the bite, even wounds that previously have been cauterized being laid open and treated afresh, to their depths. Of 103 dog-brains examined from Bombay and its vicinity, 84 disclosed Negri bodies.

Various indigenous drugs were investigated in the pharmacology department. The completion of the study of *Holarrhena antidysenterica* shows the plant (entire seed or bark) to compare favourably in anti-dysenteric value with " any of the medicines now in vogue," and to be a safe, cheap, reliable, and facile remedy for diarrhoea. The seeds of *Wrightia tinctoria* act on diarrhoea like those of *H. antidysenterica*, but the bark is much inferior. The bark of *Alstonia scholaris* is but slightly inferior to that of *H. antidysenterica* in the treatment of dysentery. Of 55 patients with diarrhoea or dysentery treated with powdered rind

of mangosteen fruit (*Garcinia mangostana*) 36 were benefited. In two of 6 cases of glycosuria the powdered leaves of *Gymnema sylvestre* appeared to be effective.

In the biochemistry department attention has been directed to controlling and improving the broth used in the manufacture of plague prophylactic, and to sprue.

The Report contains much information, from Dr. Margaret BALFOUR, about the inquest on maternal mortality and the anaemias which— affecting all the communal elements of the population—constitute one of the most dangerous complications of pregnancy in Bombay. Two classes of cases are recognized: in the one the symptoms are mainly fever and anaemia and the maternal mortality is 14 per cent. of investigated cases; in the other diarrhoea is an additional symptom, and the maternal mortality is 43 per cent.; the infant mortality in the whole run of cases is 53 per cent. The blood picture is that of a primary anaemia with high colour-index and frequency of nucleated red-cells. In 115 bloods examined malaria parasites (mostly malignant tertian) were found only in 12; in 30 Kahn's precipitin tests for syphilis 15 were positive and 15 negative; of 107 urines examined bacterially only 24 were sterile—as compared with 78 per cent. of sterile urines in normal pregnancies; in 17 faeces examinations only one disclosed hookworm. Many of the patients were well to do, able to afford good food, and living under fair hygiene conditions.

A. A.

MADRAS. Report on the Working of the King Institute of Preventive Medicine, Guindy for the Year 1924-25. With Appendices.

[TURKHUDD (D. A.), Acting Director.]—pp. 38+2. 1926. With 4 figs. Madras: Supt., Govt. Press. [1 rupee.]

In the bacteriological section much cholera, influenza, T.A.B., gonococcus and staphylococcus vaccine was produced, and some thousands of autogenous vaccines were prepared. The work of the investigation units of the Institute included three malaria surveys and two inquiries into the prevalence of kala azar. In one of the latter inquiries the existence was demonstrated of a hitherto undetected focus of kala azar at Kayalpatnam, a small seaport of some 13,000 inhabitants, in the Tinnevely district. The infection was limited to Mohammedans, although these live in close proximity to Hindus, and it appeared to have been introduced in 1884 by Mohammedans from Madras and Calcutta. In view of this discovery, further investigations were made in the Tinnevely and Ramnad districts and the disease was found to be endemic in 13 villages on the coast, the incidence among Mohammedans being 6.1 per mille, while among non-Mohammedans the incidence was 2.5 per mille. An entomological survey of the infected area was undertaken, and cimex, culicoides, phlebotomus, pulex, conorhinus and a tick (*Ornithodoros savignyi*) were collected in infected houses. *Phlebotomus argentipes* was found in all places visited in the Ramnad district, especially in houses of Mohammedans, 75 per cent. of which harboured these insects. Dissection showed that only phlebotomus and cimex appeared to harbour suspicious flagellate-like bodies, but the feeding of such animals on kala azar patients gave negative results as did the injection of crushed bodies of phlebotomus, cimex and pulex into a puppy and a monkey. Other experimental work had reference to

trachoma in monkeys and rabbits, to the differentiation of lactose fermenters in water, soil and other situations and to the testing of disinfectants for their carbolic co-efficients.

E. Wilkinson.

FEDERATED MALAY STATES. **Annual Report of the Institute for Medical Research, Kuala Lumpur, for the Year 1926.** [FLETCHER (William), Director.]—61 pp. Kuala Lumpur.

This report is full of interesting things, very readably presented, and conveniently printed.

Some careful if not very plentiful (46) trials of plasmochin are fully described. The pith of them is that plasmochin is as powerful as quinine in its action upon benign tertian and quartan parasites, and also is mortal to the crescents, but not to the trophozoites, of subtertian. No toxic symptoms or sequelae were observed in its use.

Four cases of tsutsugamushi disease have been under observation, apparently the first instances of this infection being contracted in the Malay States. A full account of these cases, one of which was fatal, is promised for the *Bulletin* of the institution for 1927.

Sixty-six cases of tropical typhus were diagnosed, and the opportunity of comparing this with tsutsugamushi disease has resulted in the conclusion that although the two have many points in common, they are quite distinct. Characteristic of tropical typhus is the strongly positive Weil Felix reaction; of tsutsugamushi disease (usually), the primary sore and bubo.

A new observation regarding the fatal disease Melioidosis (see this *Bulletin*, Vol. 22, pp. 659-662) is the finding of the bacillus (*B. whitmori*) in a superficial ulcer in man—the ulcer being evidently the point of inoculation. The bacillus—which already is known to have occurred naturally in rat, rabbit, guineapig, cat, and horse—has this year been found in a dog dead of distemper. The disease has now been discovered to exist in Indo-China.

Leptospira investigation has disclosed the existence in the Malay peninsula of infectious jaundice, seven-day fever, and autumn fever, in addition to another undetermined group; and has failed to distinguish, by serological means, the leptospiras of infectious jaundice from Noguchi's *Leptospira icteroides*.

In epidemics of measles convalescent serum has been used as a prophylactic with considerable success in control and also in mollifying the clinical course of the disease.

A sample of bacteriophage (received from Dr. D'HERELLE) "employed in the treatment of 22 cases of bacillary dysentery due to organisms of the Flexner group had no apparent influence either upon the course of the disease or upon the infecting bacilli."

A full report on diphtheria is promised. Meantime the results of 2½ years' investigation have led to the conclusions that, although the disease was almost unknown in the F.M.S. before the war, it has been endemic there for many years; "carriers are common; the population is highly immune," though "there is no evidence that the local strains of *B. diphtheriae* are less virulent than those isolated in other countries."

From a long and interesting account of enteric fevers only a few outstanding particulars can be selected. The statement that these fevers are uncommon in the F.M.S. is justified; epidemics are unknown, and in 6 years before 1926 typhoid ulcers had been found only

3 times in the course of 2,000 post-mortem examinations and only 3 carriers had been detected in the course of bacteriological examinations of 4,045 specimens of faex. Critical bacteriological and serological investigations during 1925-1926 resulted in positive diagnosis of 182 cases of typhoid, 9 of paratyphoid A, and 5 of paratyphoid B. It is noteworthy that the majority of the cases came from the smaller agricultural centres. The distribution by race was Tamils 83, Chinese 66, Malays 25, Europeans 10, Punjabis 6, Eurasians 4, others 2. The case mortality was about the same as in other countries; not more than 13 per cent. were fatal, "and this in spite of the fact that nursing, as nursing is understood in Europe, is hardly practicable in the wards of a native hospital."

In the department for the prophylactic treatment of rabies 142 patients underwent the full course; 29 had been bitten by animals attested in the laboratory as rabid, and 34 had abrasions probably contaminated with the saliva of such animals; none developed rabies. The full course consists of 14 daily injections of 5 cc. of a carbolized vaccine containing 1 per cent. of nervous tissue in 0.5 per cent. carbolic saline. A prophylactic vaccine is prepared for dogs and consists of 28 parts of nervous tissue, 48 parts of glycerine, and 32 parts of a 1.25 per cent. solution of phenol in saline, the treatment consisting of a single injection of 6 cc.; approximately 400 dogs received protective inoculation. Negri bodies were found in 48 of 94 dog-brains submitted for diagnosis.

Of 96 tumours in non-European races 21 were benign and 75 malignant; of the latter 53 were Chinese, 18 Tamil, and 4 Malay.

By the Malaria Bureau mosquito surveys of rice-fields were carried on, the value of rubber-oil was tested, and attempts were made to infect *Anopheles separatus* with benign, subtertian, and quartan parasites, but were in all cases void.

Among the items in the report of the chemical laboratory there is a description of a new method of preparing a vitamin B extract that has been pronounced to be highly efficient in the treatment of beriberi.

A. A.

GENEESKUNDIG TIJDSCHRIFT VOOR NEDERLANDSCH-INDIË. 1927.

Vol. 67. No. 4. pp. 553-573. [1 ref.] Jaarverslag van de Landskoepokinrichting en het Instituut Pasteur te Bandoeng over het jaar 1926. [**Annual Report of the Government Vaccine Institute and Pasteur Institute at Bandoeng for 1926.**]

The number of vaccinations performed during 1926 was 1,347,321 with 95.8 per cent. success. Experiments with OTTEN'S dried vaccine continued to furnish satisfactory results. This vaccine is prepared by drying pulp in a vacuum over sulphuric acid for 24 hours, reducing the dried product to powder and distributing into vacuumized tubes, which are sealed. The virulence of this vaccine was maintained for months at temperatures which destroyed the glycerinated vaccine in a few days, provided the sealing of the container was complete.

Of 936 persons who presented themselves for advice as regards antirabic treatment 683 underwent the treatment. Numerous detailed tables are given of the points which are required in the statistical analysis of the success of that treatment. Diagnostic work undertaken at the Institute ranged over the usual items of a pathological laboratory.

Vaccines and sera are distributed, such as, mixed cholera typhoid vaccine 334,342 cc.; mixed dysentery vaccine rendered atoxic by treatment with formol 69,208 cc.; old tuberculin 1,465 cc.; tetanus, dysentery and diphtheria sera, etc.

W. F. Harvey.

GENEESKUNDIG TIJDSCHRIFT VOOR NEDERLANDSCH-INDIË. 1927. Vol. 67. No. 3. pp. 339-346. Jaarverslag van het Militair Geneeskundig Laboratorium over het jaar 1926. [**Annual Report of the Military Medical Laboratory [Weltevreden, Java] for 1926.**]

This annual report shows the activity of the military medical laboratory under its director Lt.-Col. S. L. BRUG. Primarily, this activity is practical: Examination of bacteriological, protozoological, pathological or entomological material sent by the medical officers; but scientific investigations are also carried out. Among the results mentioned in this report may be cited the data concerning 2,500 examinations of the stools of 1,213 individuals. *Entamoeba histolytica* was found in 12·3 per cent., *E. coli* in 10·2 per cent., *E. tenuis* in 1·2 per cent., *Endolimax nana* in 7·3 per cent., *E. williamsi* in 7·3 per cent., *Lambia intestinalis* in 12·7 per cent., *Trichomonas intestinalis* in 2·4 per cent., *Chilomastix mesnili* in 1·1 per cent.; *Balantidium coli* and *Dientamoeba fragilis* were found once.

N. H. Swellengrebel.

TRANSACTIONS OF THE ROYAL SOCIETY OF TROPICAL MEDICINE AND HYGIENE. 1927. July 11. Vol. 21. No. 1. pp. 1-17. With 5 figs. on 1 plate.—**Laboratory Meeting, 17th March, 1927.**

The demonstrations and orations at this fascinating meeting included (1) Sections of cutaneous leishmania lesions from infection carried experimentally from man to man by *Phlebotomus papatasi*; preparations illustrating the distribution and behaviour of *L. tropica* in *P. papatasi*, and preparations illustrating diagnostic features of *P. minutus*, *africanus*, and *shortii*; all by Dr. S. ADLER. (2) Smears showing schizogony of *Plasmodium falciparum* in peripheral blood, a phenomenon frequently observed in cases of no great severity among the British forces in Macedonia, in 1917; by Major J. S. K. BOYD. (3) Specimens illustrating experimentally-produced immunity against infestation by the tumbu-fly (*Cordylobia*) maggot; Drs. BLACKLOCK & GORDON. (4) Illustrations of oriental sore of the Khurdistan bear, observed by Mr. C. MACHATTIE & Major J. R. CHADWICK. (5) BRÉSSLAU's method of exhibiting details of ciliary investment of Infusoria; thus described by Mr. C. A. HOARE:—

"A mixture of 'Phloxinrhodamin' (6·5 per cent. solution) and 'Opalblau' (10 per cent. solution), in the proportion of four to six drops of the former to 1 c.cm. of the latter, is used. A drop of fluid containing the ciliates is placed on a slide and a small drop of the mixture is added to it. The two are carefully mixed and spread over the slide in a thin film. The slide is then dried in the air and may be left unmounted, or mounted in Canada Balsam. The solution fixes and stains simultaneously; the stain being deposited in all the depressions and around all the appendages."

(6) Specimens of massive gangrene and perforation of large intestine and microscope sections of liver illustrating remarkable aggregations of entamoeba, all from a case admitted to hospital with a provisional diagnosis of typhoid. Neither enlargement nor tenderness of liver was evident during life, although one of multiple liver abscesses had burst into the peritoneal cavity; case explained by Dr. P. H. MANSON-BAHR. (7) Smears and cultures from a case of anthrax in an elephant; sections of the animal's liver and lung contra-indicated infection through gut or respiration; all by Dr. H. H. SCOTT. (8) Diagnostics of some Indian species of *Phlebotomus*; by Major J. A. SINTON, V.C. (9) Fungous aetiology of prickly heat; by Dr. E. C. SMITH. (10) Sections illustrating similarity in type of spleen lesions in yellow fever, typhus, and Rocky Mountain fever; by Dr. A. C. STEVENSON. (11) Films of human faeces illustrating multiple Protozoa infection; also twenty-years-old Giemsa-stained films mounted in Canada balsam, showing retention of stain at edge of cover-glass and fading at centre, and *vice versa* in the case of pigment of malaria parasites; by Dr. C. M. WENYON, F.R.S. (12) By Drs. W. YORKE & A. R. D. ADAMS, preparations showing remarkable concentration of *Entamoeba histolytica* cysts by the method described in *Ann. Trop. Med. & Parasitol.*, 1926, p. 281; also showing the fresh-excysted *Entamoeba histolytica* with its four massed nuclei, it being explained that usually this 4-nucleate creature splits, either directly or indirectly, into four uninucleate individuals; also were shown sections of amoebic ulceration in stomach and colon of a rabbit fed with a concentrated suspension of washed *E. histolytica* cysts, and, furthermore, a large subcutaneous amoebic abscess in a guineapig, produced by injection of a similar suspension.

Dr. Tadasu SAIKI described the results of his and Dr. FUJIMAKI's great and manifold experiments in the production of urinary and biliary calculi in white rats (and some mice and dogs) fed on sophisticated diets and also in the production of cancer by the same experimental methods. The details cannot be quoted in full here; but, to be brief, in the animals fed on a particular "vitamin A-deficiency diet" stones in bladder, kidney, and bile-duct began to form at definite terms, the stones in the bile-duct consisting mainly of cholesterol and pigment, the other stones mainly of bone-earth, triple phosphate, and a trace of Na and K. The same results were observed in rats fed on diet deficient both in vitamin A and in vitamin C. The same results also in rats fed on diet deficient both in vitamin A and in Ca and P., except that the bile-duct stones contained abundant Ca salts besides the cholesterol and pigment. Very similar results also in rats fed on diet deficient both in vitamin A and in protein, except that kidney stones were not observed, and that the bladder stones consisted mainly of bone-earth and a protein-like substance. Furthermore, in some selected rats, that had calculi, these disappeared after more than three months of a diet rich in vitamin A. In rats fed on "vitamin B deficiency diet," or on "vitamin C-free diet," or on both these diets together, or on protein-deficiency diet—as in the normally-fed controls of these experiments—no calculi were found.

In the cancer experiments "papillomatous or carcinomatous epithelial proliferations developed in the fore-stomachs of the rats fed on a vitamin A-deficient diet."

Dr. Tadasu SAIKI described his studies of some unhulled rice 144 years old. Compared with new unpolished rice the only remarkable difference in this old rice was a diminution of the fat constituent. The

catalytic activity also of the old rice was very weak, and since HIGUCHI and FUJIMAKI have found that in rice the activity of the catalase and the vitamin B content are parallel, it is to be inferred that the vitamin B content of old rice is very doubtful.

Sir Andrew Aguecheek lamented that his favourite dish did harm to his wit, and Petruchio made some trenchant remarks upon the physiological effects of his rascal cook's bill of fare ; and now we have here Dr. Tadasu Saiki complaining loudly of the menu provided by the cook who " lacks the knowledge of physiology and food chemistry " and boldly teaching " the perfection of the art and mode of cooking." His object is " to meet the nutritive requirements in each meal," not merely for a given day or year. His " wishes and hopes are so to develop the menu as to make it constitute perfect nutrition in one meal or even in one dish." The prefect of the kitchen, in short, must be an Archimagirus.

A. A.

CHOLERA.

LARA (Hilario) Interesting Features of a Rural Outbreak of Cholera due to Infected Drinking Water.—*Amer. Jl. Hyg.* 1927. Sept. Vol. 7. No. 5. pp. 606-613. With 2 text figs. & 1 graph. [Coll. of Med., Univ. Philippines, Manila.]

During the month of March, 1926, a small outbreak of cholera occurred in Capaclan and in the Poblacion on the island of Romblon, in the Philippines. The total number of cases was 25, occurring within a period of eleven days, 16 in Capaclan and 9 in the Poblacion. Twenty-three died. Twenty-four of the cases gave a history of previous inoculation with anti-cholera vaccine, 23 less than 4 months previously; 18 received only one dose. It may be questioned whether the right dose was always given. The inoculations are frequently administered by locally trained sanitary inspectors whose technique at times may be open to criticism. Of the two cases which recovered one was a boy of 12 who had never been inoculated. The cases were due to infection of a spring used for drinking. This spring was subject to surface contamination and cases of cholera had occurred in the locality about 3 months previously. Bacteriological examination of springs Nos. 1, 2 and 4 were positive for *V. cholerae*. Only No. 2 was ordinarily used for drinking purposes. The contamination of Nos. 1 and 4 was probably due to the washing of the clothes of cholera patients in them.

J. H. Tull Walsh.

PALMER (F. J.). Sporadic Cholera in Cachar and its Association with a Hitherto Undescribed Type of Organism.—*Jl. Trop. Med. & Hyg.* 1927. Oct. 1. Vol. 30. No. 19. pp. 248-254.

The author considers that our knowledge of clinical cholera is still in a fluid condition and states that experience has shown him that the textbook teachings are, in some respects, inaccurate. During the cholera season of 1925 he began to closely study films made from the stools of cholera cases. From an intensive study of films from over 60 cases there is no evidence that the comma bacillus plays any part in causing sporadic cholera in Cachar, in ordinary years. On the evidence of films, cholera in Cachar, in the absence of widespread epidemics, appears to be associated with a small cocco-bacillus, which often assumes a bi-polar staining form; also a spore-bearing bacillus was seen. Clinical cholera in Cachar has in some cases been found associated with infection presumably due to pig's faeces. The author admits that these observations are, for many reasons, imperfect.

J. H. T. W.

i. **BRAHMACHARI (B. B.). On the Prevalence of *Vibrio cholerae* in Some of the Endemic Areas of Bengal.**—*Indian Jl. Med. Res.* 1927. Oct. Vol. 15. No. 2. pp. 361-371. [15 refs.]

ii. —. **Can the Non-Agglutinating Vibrios be Mutation Forms of the Cholera Vibrio?**—*Indian Med. Gaz.* 1927. Nov. Vol. 62. No. 11 pp. 630-633. [5 refs.]

i. This is a report of the Officiating Director of the Bengal Health Laboratory. With a view to finding out the distribution of cholera

carriers the author examined, from November 1926 to May 1927, the stools of 3,598 persons in villages of Central Bengal and 2,176 stools of persons in North Bengal. Later, June to December, stools of 1,377 villagers living near Calcutta were examined, and healthy persons from whom agglutinating vibrios were obtained were two contacts and three persons having no connexion with the disease, the total rate being 0·4 per cent. The number of persons carrying non-agglutinating vibrios was 13·7 per cent. In cases examined month by month from June to November no agglutinating vibrios were found; but in November and December they were present in one-third of the cases. To elucidate the relation of non-agglutinating vibrios to the typical *V. cholerae* the author was studying 69 such strains including 19 from water.

ii. In this paper the author gives details of the investigations mentioned above. He finds that vibrios which do not agglutinate with the standard cholera immune serum are more common than the agglutinating type and concludes that the non-agglutinating vibrios are but the agglutinating types transformed by the environment through which they have passed or in which they are sojourning. [All bacteria are liable to variation and non-agglutinating strains are well-known in other groups. Compare for instance *Enterica*—this *Bulletin*, Vol. 16, pp. 449–450 (GARROW, and other references).]

J. H. T. W.

MASTROIANNI (A.). Dimostrazione rapida del vibrione del colera con un nuovo apparecchio per siero-diagnosi. [**Rapid Demonstration of *V. cholerae* by a Method of Serum Diagnosis.**]—*Riforma Med.* 1927. Sept. 5. Vol. 43. No. 36. pp. 847–848. With 1 text fig.

The “new apparatus” described by the author consists of two test tubes, the larger measuring 20 cm. in height and 2·5 cm. in diameter, the small one 10 cm. and 1 cm. in diameter. Each has a small cross tube near the top. The large tube is filled to the cross tube with peptone water and inoculated with the suspected faecal matter, it is then incubated for 5 or 6 hours. The smaller tube containing the anti-serum is then joined to the large one by the cross tubes. By tilting the large tube a minute quantity of the culture can be passed into the serum tube and agglutination observed. The tubes can easily be separated for cleaning and sterilization.

J. H. T. W.

BRAHMACHARI (B. B.). **Forecasting of Epidemic Activity of Cholera.**—*Calcutta Med. Jl.* 1927. May. Vol. 21. No. 11. pp. 525–535. With 6 text figs.

The author believes that if we could predict outbreaks of cholera much mental and economic strain would be saved. The problem has indeed aroused attention [*v.* this *Bulletin*, Vol. 22, p. 765 (RUSSELL, ROGERS, KING); Vol. 24, p. 41 (ROGERS)]. The author, as the result of his studies, has produced the seasonal curve of cholera in Bengal. As regards cyclical periodicity he gives a chart of mortality in Bengal from 1891 to 1924 from which it will be seen that “in 27 out of these 34 years, the figures of the cholera mortality were more or less on the

graph of a cycle, their deviations from the centre of gravity being obviously a harmonic function of time, the equation being :—

$$Y=a \sin nX "$$

With the norms for the months calculated ready to hand prediction of the disease for the next succeeding months is not so difficult.

J. H. T. W.

ARNOLD (Lloyd). **The Auto-Sterilizing Mechanism of the Gastro-Intestinal Tract. (A Note on the Use of Dilute Acids in the Prevention and Treatment of Cholera).**—*Indian Med. Gaz.* 1927. Aug. Vol. 62. No. 8. pp. 444-448. [18 refs.] [Univ. of Illinois, College of Med., Chicago.]

The author notes the well known inhibitory effect of the gastric acid on certain bacteria and gives tables showing the condition of the intestinal flora in dogs under varying H-ion concentration. Bacteria introduced into an empty stomach of a dog 12 to 18 hours after a meal do not reach the caecum. Bacteria introduced with alkaline buffered milk reach the caecum in large numbers over a relatively long period of time ; when given in acid buffered milk they sometimes reach the caecum but only a few bacteria do so and these soon disappear. Bacteria given by the mouth to a dog in acid buffered aqueous solutions seldom reach the caecum ; but when given in alkaline solutions they do so. The author calls attention to Dr. TOMB's success in treating cholera with sulphuric acid, essential oils and a little alcohol. Useful references are given at the end of the paper.

J. H. T. W.

WATSON (Malcolm). **The Control of Cholera on Rubber Estates.**—*Malayan Med. Jl.* 1927. Dec. Vol. 2. No. 4. pp. 122-123.

The author asserts that the freedom from cholera of the estates in Selangor, in the past few years, is mainly, if not almost entirely, due to the efficient quarantine system now in force. Fifteen or twenty years ago cholera was frequently seen in the Selangor Coast Districts. Cholera still comes over in steamers year by year ; but has not been seen on any estate in the coast districts since 1911 with the exception of 1918 and 1926. Few managers have had any experience of controlling the disease. When a coolie in the lines is suspected to have cholera, the first thing is to isolate him and the contacts. This should be done by building a hut for him and another for the contacts. It is not desirable to send a cholera case to an ordinary estate hospital. Not more than three persons are placed in a contact hut. The belongings of these coolies are taken from their rooms, piled in a heap and burned. The contacts are stripped, washed in a solution of izal, given 4 yards of calico as a cloth and given new cooking pots. They take nothing from their rooms. If a case develops among any contacts, the hut and its contents are burned. The sick man is taken to the cholera camp, and the other two are disinfected again, and given a new hut and new clothing, etc. They are not to be put with other contacts. Food is brought to the camp and distributed to the huts ; but the contact coolies cook for themselves, to give them some occupation. All water should be boiled. A temporary latrine trench is dug and frequently disinfected during the day. Inoculation of contacts has proved of value, making them immune and limiting the disease.

J. H. T. W.

FERNANDO (Juan S.). **Inoculation and Hospitalization in the Control of Cholera Epidemic.**—*Jl. Philippine Islands Med. Assoc.* 1927. Oct. Vol. 7. No. 10. pp. 385-393. With 3 charts. [12 refs.]

The author is a Medical Inspector, Philippine Health Service, and gives the results of his observations in a summary:—

1. Inoculation confers a certain degree of immunity which partly influences the duration of the epidemic.

2. Immunity is not absolute; persons inoculated contract the disease.

3. Intensive and systematic inoculation with isolation in hospital of cases, contacts and carriers make a more effective combination.

J. H. T. W.

D'HERELLE (F.) & MALONE (R. H.). **A Preliminary Report of Work carried out by the Cholera Bacteriophage Enquiry.**—*Indian Med. Gaz.* 1927. Nov. Vol. 62. No. 11. pp. 614-616. [Central Research Inst., Kasauli, India.]

The correlation of the presence of bacteriophage and recovery from cholera is given in the following series of cases: (1) 3 cases with no bacteriophage present, all died; (2) 3 cases with feeble bacteriophage which disappeared, all died; (3) 2 cases with strong bacteriophage on admission, recovered promptly; (4) 13 cases with weak bacteriophage which increased in potency, all recovered with some delay; (5) 2 cases with fluctuation of potency, recovered with some delay. The conclusion drawn is that recovery or death is intimately associated with the behaviour of the intestinal bacteriophage. The epidemiology of cholera is also explained in terms of bacteriophage. With the occurrence of a first case of cholera in a village vibrios are passed out and find their way into wells or are taken up by flies. When convalescents appear, the bacteriophage, as well as the vibrio, passes out into wells or is taken up by flies. The epidemic comes to an end when the bacteriophage "contamination" becomes general. It is but a further step to apply these facts to prevention and treatment. In one village the epidemic came to an immediate end with the addition of 30 cc. of bacteriophage culture to the two wells supplying it with water. Again, in 4 villages in which treatment of cholera was undertaken the sum total of results was, 68 deaths among 107 cases not treated with bacteriophage and only 3 deaths out of 41 cases among the treated. The further results of this preliminary enquiry will be awaited with interest [it would be especially interesting to have strictly alternate cases only treated with bacteriophage].

W. F. Harvey.

SAITZWEA (E. V.). **Sur la nature des vibrions, isolés de l'eau de la Néva pendant l'absence de l'épidémie du choléra. [Vibrios isolated from the Neva during Absence of Epidemic Cholera.]**—*Arch. Sci. Biol.* 1927. Vol. 27. No. 1-3. French summary p. 206. [In Russian pp. 189-198.] [Epidem. Lab., Inst. of Experim. Med., Leningrad.]

In the months of March and April 1926, when no signs of cholera were present, two strains of a vibrio, identical with *V. cholerae*, were isolated from the water of the Neva at Leningrad. All waters should be examined periodically for vibrios in view of their possible connexion with epidemics.

J. H. T. W.

JETTMAR (H. M.). **Investigations on the Vitality of *Vibrio Cholera* on Chinese Paper Money.**—*Nat. Med. Jl. China.* 1927. June. Vol. 13. No. 3. pp. 254–260. [14 refs.] [N. Manchurian Plague Prevention Service, Harbin.]

It is well known that cholera vibrios when dried on solid objects die in a comparatively short time. Any degree of moisture may delay their death. It is of practical interest to know how long *V. cholerae* may live on coins and bank notes. UFFELMANN has shown that the vibrios perish quickly on coins and more quickly on copper and silver coins than on gold. It is a question of some importance for North China, with its almost exclusive paper currency, to know for how long the vibrios will live on infected banknotes. From his experiments the author concludes that: The cholera vibrios when dried on banknotes touched by fingers infected with cholera stools remain alive up to 4 hours. *V. cholerae* cultivated from banknotes 4 hours after contamination showed the same cultural and serological qualities as the original strain. Thus, during cholera epidemics the use of banknotes is not entirely free from danger.

J. H. T. W.

LANDSTEINER (K.) & LEVINE (Philip). **On a Specific Substance of the Cholera Vibrio.**—*Jl. Experim. Med.* 1927. Aug. 1. Vol. 46. No. 2. pp. 213–221. [2 refs.] [Rockefeller Inst. Med. Research, New York].

Whereas extracts with ether or strong alcohol were inactive, that made with 75 per cent. alcohol was specifically active. A flocculent precipitate appeared in the extract on cooling, which when separated and washed with absolute alcohol and dry ether, furnished a grey-white powder. The powder gave the precipitin reaction with cholera immune serum in high dilution and was free of bacilli. It had antigenic capacity and contained both protein and carbohydrate. On further purification a white powder was obtained almost protein-free and devoid of antigenic activity. "When hydrolysed with N-2 hydrochloric acid, sugar could be demonstrated by Fehling's solution and by the osazone test." On testing with cholera immune serum this purified substance gave as high a precipitin reaction as the original cruder product. Thus in the original crude extract there was present an antigenic complex of protein and specific substance. The purified extract, on the other hand, still contained specific substance as shown by its reaction with immune serum, but was protein-free and not by itself antigenic: it would appear either to be of intricate structure or a complex carbohydrate resembling that described by AVERY and HEIDELBERGER.

W. F. Harvey.

HAHN & HIRSCH. **Choleratoxin und Antitoxin.** [**Cholera Toxin and Antitoxin.**]—*Cent. f. Bakt. I. Abt. Orig.* 1927. Vol. 104. No. 1-4. pp. 211–212.

It is only by the use of comparatively fresh strains that potent toxins have been obtained. Among the most striking results of the authors were: (1) The production of toxin in cultures within 8 hours and maximum production in 3 days; (2) a further concentration of toxin by dialysis; (3) the production of heavy growths in a short time,

with maximum at 5 to 6 hours. The last result was only rendered possible by continual rectification of the pH point of the medium to above 7.2, and was obtained by the addition of about 100 cc. N-2 soda per 500 cc. in 12 hours. Two of their strains furnished toxins within 3 days which killed 200-250 gm. guineapigs intraperitoneally in 12-24 hrs., in amounts of $\frac{1}{4}$ to 1 cc. After a 2 months course of treatment of goats with comparatively small doses of toxin they have obtained an antitoxin of which 0.005 cc. neutralized one minimum lethal dose of the toxin. Ten times this dose of antitoxin injected intraperitoneally, one hour after the toxin, could still preserve a guineapig from death. In addition to acting as an antitoxin the serum was both agglutinating and bacteriolytic.

W. F. Harvey.

POPESCO-COMBIESCO (Cornelia). Action préventive vis-à-vis de la péritonite vibrionienne expérimentale de l'extrait de plaquettes sanguines de lapins immunisés contre le vibrion cholérique. [**Protective Action of the Extract of Blood Platelets of the Immune Rabbit against Cholera Vibrio Peritonitis.**]-*C.R. Soc. Biol.* 1927. Oct. 13. Vol. 97. No. 26. pp. 1001-1002. [1 ref.] [Exper. Med. Lab., Faculty of Med., Bucarest.]

This action was shown to exist for the blood platelets themselves (this *Bulletin*, Vol. 24, p. 46). The extract now tested is made with distilled water, freed by centrifugation from corpuscular stroma and made isotonic by the addition of salt. Out of 6 immunized rabbits, 4 furnished extracts which protected and 2 extracts which were in no way protective, although the corresponding sera were highly agglutinative and vibriolytic. The results with the extracts were as follows: 11 guineapigs out of 20 survived as against none out of 7 controls. The same test carried out with an extract of blood platelets of the normal rabbit gave 2 survivors out of seven. Microscopical examination of the peritoneal fluid of guineapigs, reserved for the purpose, showed a rapid transformation of the injected vibrios into granules, as in the usual Pfeiffer phenomenon. There could be no suspicion, however, in these well washed platelets that some residual immune serum remained attached to them. Moreover the same phenomenon was exhibited by extract of normal platelets.

W. F. Harvey.

ENGELHARDT (Wilhelm Erwin) & RAY (Jyotis Chandra). Zur Frage der oralen Immunisierung gegen Cholera. [**Oral Immunization against Cholera.**]-*Ztschr. f. Hyg. Infektionskr.* 1927. July 25. Vol. 107. No. 3-4. pp. 663-676. [18 refs.] [Hyg. Inst., Univ. Berlin.]

The somewhat contradictory views of various workers and the results of their own re-investigation of the subject are here set out. An endeavour is made to determine; (1) whether it is possible to produce cholera experimentally in either guineapigs or rabbits, and if so, whether it is possible to immunize *per os* against such orally produced cholera; (2) whether it is possible to immunize orally against parenterally produced cholera; (3) what the agglutination reactions are under these circumstances.

The results obtained were : (1) It was only in some cases possible to obtain oral infection in guineapigs which had been sensitized with bile, and then only with very large doses. This method could not therefore be used for testing the value of oral immunization ; (2) It was not possible to effect an immunization orally in guineapigs either with living or dead vibrios against intraperitoneal or intracardiac infection, even if they had been sensitized with bile ; (3) It was not possible to obtain oral infection in healthy rabbits when sensitized with bile. This was possible however in rabbits which had received vibrios orally for immunization purposes and which had received the associated treatment of bile and no food, if large doses of cholera vibrios were used to infect. The resistance of these rabbits had been lowered or they had become more susceptible to infection ; (4) It was possible to immunize sensitized rabbits orally with very large doses of living vibrios, provided they had survived the immunization process ; (5) It was not possible to develop immunity in rabbits with killed vibrios ; (6) A significant increase in the agglutination titre could only be attained in sensitized rabbits which had been treated with killed vibrios ; (7) Bile pastilles produced no harmful symptoms in man ; (8) It is not possible to draw satisfactory conclusions from animal experiment for application to man owing to the variability found to exist among different species of animals.

W. F. Harvey.

LEAGUE OF NATIONS. Health Organisation. **Cholera Bilivaccine and Anti-Cholera Vaccine : a Comparative Field Test.** [RUSSELL (A. J. H.).]—29 pp. C.H.662. [12 refs.] 1927. Oct. 27. Geneva.

The author gives the data of a controlled test in India of these two vaccines and a comparison of these with each other and with results amongst the untreated. These vaccines were given in hamlets chosen as affording the best opportunities for the work, while the untreated controls were made up of persons in households who refused treatment. Although these two factors introduce elements of selection in the groups of treated and untreated they were not considered such as would greatly influence the result in regard to age and sex distributions. In 72 villages the vaccines were administered side by side and a special analysis of this important part of the trial is given. Here the groups of the treated are directly comparable. A separation is rightly made of the groups of individuals receiving one, two and three doses of vaccine. It is interesting to know that in a certain proportion of cases the bile pills caused a severe, acute diarrhoea. The two doses of anti-cholera vaccine contained 12,000 million cholera bacilli and the three doses of bilivaccine something over 200 billions. Amongst the 1,448 persons receiving two doses of anti-cholera vaccine there was an attack incidence of 0.41 per cent. (6 cases) and percentage mortality of 16.7 (one case). Of 3,085 persons receiving the full course of 3 doses of bilivaccine 15 were attacked (0.49 per cent.) and 4 died (26.7 per cent.). In the group of 7,664 controls 160 were attacked (2.1 per cent.) and 71 died (44.4 per cent.), which gives an attack incidence 4.6 and 5.2 times, respectively, higher than the rates for the two protected groups. The work of vaccination was not done in any village before the onset of the epidemic. In general it was only after some persons had been attacked and a few had died that the vaccination work started. This, too—it is pointed out—introduces an element

of selection. Special reference in the report is made to the facts which help to determine the reliability of the statistics collected. Actual figures of attacks and deaths were obtained from the reports of village munsiffs and these were subsequently verified by the sub-assistant surgeon medical staff concerned in the enquiry. That the data are homogeneous, except as regards vaccination and attack or death, can be shown by independent evidence. The evaluation of numerous correlation coefficients make it possible to conclude that : (1) The case for anti-cholera vaccination is a strong one ; (2) the immunity conferred by a single dose of anti-cholera inoculation is nearly as high as that conferred by a full course of oral vaccine ; (3) "it may therefore be inferred that, remembering the limitations already mentioned, a high degree of immunity is conferred by the administration of the oral and subcutaneous vaccines, but that the effect of the anti-cholera inoculation is in the long run superior to bilivaccine treatment."

W. F. Harvey.

MARSH (E. B.). **A Lecture on Cholera.**—*China Med. Jl.* 1927. July. Vol. 41. No. 7. pp. 597-605.

This lecture deals only with the pathology and treatment of cholera. It contains nothing new ; but, within its limits, is full of concise information on the bearing of pathology on treatment.

J. H. T. W.

TOMB (J. W.). **A Criticism of the General Treatment of Cholera by Intravenous Hypertonic Saline Injections.**—*China Med. Jl.* 1927. Oct. Vol. 41. No. 10. pp. 840-847. [9 refs.] [Asansol Mines Board of Health. Bengal, India.]

The main arguments and most of the details of this paper have been published in another journal ; and were noticed in this *Bulletin*, Vol. 24, p. 924 (TOMB).

J. H. T. W.

BANERJEE (Sudhindra Nath). Observations on 106 Cases of Cholera (treated in the Carmichael Medical College Hospitals).—*Calcutta Med. Jl.* 1927. Nov. Vol. 22. No. 5. pp. 237-248.

BLACK (E. H.). An Epidemic of Cholera in the Lower Perak District along the Perak River.—*Malayan Med. Jl.* 1927. Dec. Vol. 2. No. 4. pp. 123-127.

BUDDLE (R.). A Case of Cholera treated by the Essential Oils Mixture of Tomb.—*Jl. Roy. Nav. Med. Serv.* 1927. Oct. Vol. 13. No. 4. pp. 304-305.

MAXWELL (James L.). The History of Cholera in China.—*China Med. Jl.* 1927. July. Vol. 41. No. 7. pp. 595-597.

QUÉMENER (E.). Epidémie de choléra dans l'établissement français de Karikal (juin-juillet-août 1927).—*Bull. Soc. Path. Exot.* 1927. Oct. 12. Vol. 20. No. 8. pp. 708-710.

THOMSON. L'épidémie de choléra de l'Irak en 1927.—*Bull. Office Internat. d'Hyg. Publique.* 1927. Nov. Vol. 19. No. 11. pp. 1620-1626. With 1 map.

TOMB (J. W.). The Essential Oils Treatment of Cholera. [Letters, Notes & Answers.]—*Brit. Med. Jl.* 1927. Aug. 20. p. 332.

PLAGUE.

DICKIE (Walter M.). **Plague in California 1900-1925. Plague Pathology and Bacteriology.**—*Proc. Conference of State & Provincial Health Authorities of North America, 1926.* pp. 30-78. With 14 charts & 3 figs. on 2 plates.

Plague, when it first appeared in San Francisco in 1900, did not spread beyond the Chinatown quarter of the city. The infection lasted for four years and 121 cases with 113 deaths were recorded. The second visitation in San Francisco began in May, 1907. The disease spread widely over the whole city, and its extension was probably favoured by the ruinous condition following upon the earthquake and fire from which the city suffered in April, 1906. From May, 1907 to November, 1908 there were 160 cases, almost all among white persons, with 78 deaths. From that date till 1925 there were 18 outbreaks in California; all except two were of the bubonic type; and most of them consisted of less than 5 cases. During the 25 years reviewed in this report there were 372 cases with 257 deaths. A pneumonic-plague outbreak of 14 cases occurred at Oakland in September, 1919; 13 of the patients died. As so often happens even in communities with a skilled medical and public health service the nature of the outbreak was missed for a time, although the cases exhibited a high fatality, and although the circumstances indicated a history of close contact with pre-existing cases. In October, 1924 the second epidemic of the pneumonic type occurred at Los Angeles: there were 32 cases with 30 deaths in the Mexican quarter of the city. The true nature of the early cases in this outbreak was not at first recognized. [In the reviewer's opinion the recognition of pneumonic plague is not difficult provided that the mind is kept open to the possibility of its occurrence—a suspicion is justified wherever rodent plague is known to exist—and provided recourse is had to the simple and extremely useful procedure of examining smears taken by puncture from the apices and bases of the lungs and heart-blood of persons found dead in suspicious circumstances. By this means invaluable knowledge may be gained in a few minutes. Lung puncture as a diagnostic aid during life, should certainly be practised more often than hitherto.] The general features of the two Californian outbreaks of pneumonic plague are so typical that details need not be given, but it is worth noting that the Oakland epidemic was traced definitely to ground-squirrel plague, and that the Los Angeles epidemic was brought about by rat infection; bubonic plague in man formed the intermediate link.

A table giving the distribution of human plague in California from 1900 to 1925 shows the origin of each outbreak. The two outbreaks in San Francisco, referred to above, were of rat origin; the next bubonic outbreak of 16 cases in Alameda County was associated with both rat and squirrel plague; the next fourteen outbreaks, all of them bubonic with the exception of the Oakland epidemic, originated from squirrel infection; and the last three outbreaks, all of them in Los Angeles County or City, arose from rat plague. An important clue to this order of events is the circumstance that ground-squirrels and rats may occupy the same burrows, that the fleas of these rodents readily exchange hosts, and that the fleas of both species may bite man in the absence of their proper hosts; moreover, for many years

squirrels were largely used as an article of food. Dr. Dickie believes that in Los Angeles City and County rat plague preceded and was responsible for plague among the ground-squirrels.

The report gives an account of the quarantine measures taken to limit the pneumonic outbreak in Los Angeles. These were systematically and thoroughly done and undoubtedly helped to bring the epidemic to an end. Loss of virulence of the strain of bacillus was not responsible for the decline since the cultures isolated from the last autopsy were as virulent as those from the first.

An account is given of the pathological findings in 9 cases of primary pneumonic plague and of some cases of bubonic plague.

A table summarizes observations on the fermentation reactions of 15 local strains including 3 human and 11 rat strains. All fermented glucose, mannite, laevulose and arabinose. None fermented lactose, cane sugar, dulcitol, raffinose and glycerine. 11 strains gave acid in maltose; 1 gave a very slight reaction; and 3 failed to ferment this carbohydrate. A good positive reaction in salicine was given by 4 strains; a slight reaction by 6 strains; and no reaction by 5 strains. A good positive reaction in galactose was given by 3 strains; a slight reaction by 6 strains; and 6 failed to ferment galactose. These results are consistent with those of previous workers except that the Californian strains seem to possess little ability to ferment galactose. The fermentation tubes were kept in each case for 7 days.

An infection of the rats at Los Angeles with bacteria of the *Salmonella* group gave lesions which caused confusion with those of plague. It would be interesting to know whether there was any evidence that such rats were taken from areas where rat virus had been laid down.

A note on the complement-fixation reaction in plague infections indicates the probability that this test has a greater positive than negative value. A simple technique is suggested for the demonstration of agglutinins in immune sera; this consists in growing the plague bacillus in broth containing graduated dilutions (1 in 10 to 1 in 300) of sterile inactivated immune serum. The results are compared with those in a series of tubes which contain corresponding amounts of normal serum; flocculation occurs more quickly and is more marked in the tubes containing the immune serum.

G. F. Petrie.

DOORENBOS (W.). Bijdrage tot de kennis van de epidemiologie van de pest in Egypte. [**On the Epidemiology of the Plague in Egypt.**] — *Nederl. Tijdschr. v. Hyg. Microbiol. en Serol.* Leyden. 1926. Vol. 1. No. 4. pp. 278-304. [10 refs.] [Lab., Quarantine Council of Egypt, Port Tewfik.]

The occurrence of epidemics of plague in Egypt depends, as elsewhere, on the contact between man, flea and rat and all those conditions associated with it, as housing, nature of soil, temperature, moisture, species of rats and fleas, etc. In the northern ports plague is most common between May and September, when conditions are most favourable for the development of *Xenopsylla cheopis*.

Between February and June, 1926, the author investigated in Port Said for the Quarantine Council of Egypt the conditions of rats and their fleas, paying special attention to the influence of season on the average number of fleas per rat. More than 3,000 living rats were collected from various parts of Port Said, but in none of them could

plague bacilli be detected. Only in one case of a dead rat were plague bacilli isolated. All the rats collected in the Arabian quarter were of the species *R. norvegicus*. In the European quarter were caught 47 *R. rattus*, all in warehouses; mostly in the Bonded Stores. The author thinks that these were imported by ships.

Amongst the fleas found on these rats two species predominated: *Xenopsylla cheopis* and *Leptopsylla musculi* (*Ctenopsylla musculi*). The investigations show that while the average number of the *X. cheopis* per rat increased gradually from February to June, the number of fleas of the other species decreased continuously.

Although there was apparently an epidemic of plague amongst the rats in March, no cases occurred amongst men, probably because during that month the average number of *X. cheopis* was low and also because the contact between man and *R. norvegicus* is not a close one. The *X. cheopis* is a rather lazy insect and does not jump far, while the *Leptopsylla musculi* is of little importance in the transmission of plague from rat to man, since men are not easily bitten by it.

The author gives also an account of his experiments with d'Hérèlle's bacteriophage. This was sufficiently virulent to dissolve in 20–30 hours a 24-hours-old culture of plague bacilli in broth. He used rats of the *norvegicus* species weighing 150–200 grams each.

Eight rats were inoculated with 0.1 cc. of an emulsion of liver from a rat which died of plague. Four of these rats were fed on bread only. They died after 3–4 days and their organs showed typical signs of plague. The other four were fed on bread to which 1 cc. of the bacteriophage F.P. No. 31 was added. One of this group remained alive, three others died after 4–7 days, the organs showing a picture of a less acute character. In one case the culture from organs remained sterile.

In another experiment 0.2 cc. of a freshly prepared bacteriophage (F.P. No. 5) was injected under the skin of four rats and at the same time the animals were inoculated with 0.1 cc. of a culture of plague bacilli in broth. Four others received a dose of 0.01–0.1 cc. of this culture, but no bacteriophage.

The first four remained alive, while the others died after 3–4 days.

H. Lwow.

ALLAN (W.). **Report on Plague in Nigeria for the Year ending 31st December, 1926.**—*Ann. Med. & San. Rep. Nigeria, 1926.* Appendix E. pp. 191–201. With 6 figs. on 3 plates.

This is an ordinary official report illustrated with photographs showing how difficult it is to cope with the spread of plague in crowded areas of houses with thatched roofs and bamboo; and where trading in foodstuffs is carried out in the streets. During 1926, 497 cases were reported with 476 deaths; of the total number 44.5 per cent. were bubonic, 48.7 per cent. septicaemic and 6.8 per cent. pneumonic. Pneumonic cases were most numerous in October. Full details of methods for rat destruction and other sanitary precautions are given; they contain nothing new. 16,303 inoculations against plague were carried out by the Port Health organisation and 15,778 persons were inoculated by other departments.

J. H. Tull Walsh.

GIRARD (G.). Epidémiologie de la peste pulmonaire à Madagascar. Deuxième mémoire. [**Epidemiology of Pulmonary Plague in Madagascar.**]—*Bull. Soc. Path. Exot.* 1927. July 13 & Oct. 12. Vol. 20. Nos. 7 & 8. pp. 632-652; 759-770. With 1 map & 1 chart in text. [26 refs.] [Pasteur Inst., Tananarive.]

From observation and from experiments the author draws the following conclusions:—

1. The pneumococcus retards the evolution of pulmonary plague in man.

2. In animals the association of the pneumococcus with *B. pestis* causes an infection more serious than where these germs are inoculated separately [see this *Bulletin*, Vol. 24, p. 934 (GIRARD)].

J. H. T. W.

LONG (John D.). [Recherches sur les possibilités d'introduction et de propagation de la peste bubonique dans la zone du canal de Panama.] [**Possibility of Introduction of Plague into the Panama Canal Zone.**]—*Boletín de la Oficina sanitaria panamericana.* 1927. Oct. Vol. 6. No. 10. p. 701. [Summarized in *Bull. Office Internat. d' Hyg. Publique.* 1927. Oct. Vol. 19. No. 10. pp. 1496-1499.]

The last case of locally produced plague occurred in the Canal Zone in 1905. Since then a constant war on rats has been made by trapping and poison and by protecting buildings. In the district of Ancon-Balboa a great part of the quays and houses are constructed of cement and wooden buildings are raised. In the district of Christobal-Colon the conditions are much the same and constant inspection is carried out. In the district of Panama 50 to 60 per cent. of the houses are rat-proof. The identification of fleas is carried out and the chief species found is *X. cheopis*. The author thinks that plague can only be introduced by ships stopping at canal ports. Such ships are generally fumigated in United States ports, but ships coming from S. America which have not been periodically fumigated must be considered as asylums for infected rats. Finally, as regards wild rodents possibly susceptible to plague the author records two wood rats: *Sigmodon hispidus chiriquensis* and *Proechimys semispinosus panamensis*; but no experiments have yet been made, nor are their fleas known.

J. H. T. W.

FORSTER (W. H. C.). **Predicting Epidemics of Plague in the Punjab.**—*Public Health Rep.* 1927. Oct. 14. Vol. 42. No. 41. pp. 2502-2508.

"1. The seasonal curve of plague mortality in the Punjab for the period 1901-1924 shows a progressive and uninterrupted high monthly increase from August to the following April.

"2. The number of fleas per rat shows, according to the data on hand, a similar curve.

"3. The mortality from plague, other than pneumonic-[which plays no important part in the Punjab], being the expression of the number of infected fleas which have bitten human beings, it is logical to assume that the reproduction of fleas has an important influence upon the seasonal mortality curve.

"4. As a corollary to (3), a check in the cycle of reproduction of fleas should be reflected in a corresponding decrease in the seasonal mortality curve.

"5. Humidity being a factor of vital importance in the cycle of flea reproduction, it is reasonable to assume that, in the arid plains of the Punjab, that cycle is affected by the rains.

"6. Analysis of statistical data for 26 years shows that a drop in the seasonal curve for December indicates no epidemic the following spring.

"7. . . . A decline in the fall-winter part of the curve, whatever it may be in the other months, is not necessarily an indication that there will be no epidemic the following spring."

J. H. T. W.

PAISLEY (J. C.). **The Diagnosis of Rat Plague. An Analysis of Two Hundred Recent Post-Mortems.**—*West African Med. Jl.* Lagos. 1927. Oct. Vol. 1. No. 2. pp. 35-36.

The post-mortems were carried out from November 16th, 1926 to January 22nd, 1927, and from February 11th, 1927 to July 30th, 1927. During the first period the epizootic was at its height, while the second corresponds to a time of sporadic cases only. Subcutaneous congestion is common and may be detected before the skin is incised, the thorax and legs especially having a pink appearance. Congestion of the smaller vessels of the thorax and cervical regions has been found to be almost diagnostic. Subcutaneous haemorrhages are not common and not confined to plague rats. A primary bubo when present is the most characteristic sign of plague; they may be multiple and were found in the groin, axilla, cervical and other regions. In the first series 47 rats had no buboes and in the second series 10 had no buboes. The liver does not give information of much value, nor does the spleen show any characteristic change. The intestine in certain plague rats showed extensive haemorrhages and the small intestine was full of altered blood—20 rats in series I and 17 in series II. Pleural effusion is a fairly constant sign.

J. H. T. W.

CARMAN (J. A.). **The Treatment of Bubonic Plague with Iodine, Camphor and Thymol.**—*Kenya & East African Med. Jl.* 1927. Oct. Vol. 4. No. 7. pp. 196-200. With 2 charts.

The author refers to the need for some drug that will exert a specific lethal action on *B. pestis*. Neosalvarsan, novarsenobillon and Bayer 205 have been tried, but none of these has proved to have a definitely specific action on the disease. Dr. Carman's treatment is based on the observations of MALLANAH [v. this *Bulletin*, Vol. 16, p. 430]. The treatment was commenced, during an epidemic in Nairobi, in December, 1926. All patients were given a purgative and an injection as soon after admission as possible. The injection into the bubo contained: tinct. iodi mitis m. 15, camphor and thymol 32 gr. 7½ in 2.0 cc. distilled water. If the temperature did not drop by next day another injection of half the dose was given; otherwise a full dose was given on alternate days until recovery was assured. Two cases are described in detail with temperature charts. The following statistics are given: Whereas of 64 cases treated in this epidemic 33 died, the number of deaths in the 27 treated by iodine, etc., was 9.

J. H. T. W.

PAL (R. D.). **The Serum Treatment of Plague.**—*Indian Med. Gaz.* 1927. Oct. Vol. 62. No. 10. pp. 569–570.

After reviewing various drugs that have been, or are at present, used for the treatment of plague the author states that the only treatment that has had any consistent success in his hands has been with anti-plague serum (obtained from the Pasteur Institute, Paris, or the Indo-French Drug Co., Bombay). The author has been using the serum for the last three years with most encouraging results. 40 to 60 cc. have been given intravenously morning and evening till the temperature drops to normal. It is waste of time to give the serum subcutaneously. Most of the failures of serum treatment are due to the small dosage employed and the fear of anaphylaxis which scares many a medical man from giving it intravenously. Should anaphylaxis appear adrenalin is used to combat it. The author also recommends small doses of morphia to check restlessness and to encourage sleep; and the following stimulant mixture:—

Ammon, carb.	...	...	...	gr. v.
Digifortis	...	...	...	m. x.
Aqua chloroform	...	...		ad oz. i.

which may be given every 4 hours.

J. H. T. W.

ROQUES (P.). Notes au sujet de la sérothérapie préventive de la peste pulmonaire. (Observations faites au camp d'isolement de Mahazoarivo, Tananarive, du 1er janvier au 25 mai 1927). [**Serum Prophylaxis for Pneumonic Plague.**]—*Bull. Soc. Path. Exot.* 1927. July 13. Vol. 20. No. 7. pp. 579–583. [Municipal Bureau of Hyg., Tananarive.]

The cases treated were mainly plague "contacts" isolated in a special camp. For those exposed to contact with bubonic plague, one subcutaneous injection of 20 cc. of anti-plague serum seemed to confer immunity. In the cases of "contacts" with septicaemic plague an intravenous injection of 100 cc. of serum conferred a similar immunity. With those exposed to possible infection from pneumonic plague an intravenous injection of 100 cc., given on the first day of isolation reduced the mortality by nearly 50 per cent.; but this method can only be used when the contacts are isolated and under observation. The doses noted are for adults; for children they are reduced according to age. This serum preventive treatment should be undertaken as early as possible in "contacts" or suspected "contacts."

J. H. T. W.

CAIUS (J. F.), KAMAT (S. A.) & NAIDU (B. P. B.). **The Bactericidal Action of Some Organic Compounds of Mercury on *Bacillus pestis*.**—*Indian J. Med. Res.* 1927. Oct. Vol. 15. No. 2. pp. 327–333. [2 refs.] [Haffkine Inst., Parel, Bombay.]

Two groups of organic compounds were used, derived from mercuration of (1) phenol, (2) the dye stuffs trypan blue, trypan red and acid fuchsin. The bactericidal action of these derivatives was tested by the inhibitory method, which showed that they were much more

active than the phenol or dye stuff from which they had been prepared. Their activity was very uniformly proportional to the amount of mercury present and not to any extent altered by modifications in chemical constitution.

W. F. Harvey.

NAIDU (B. P. B.) & SHAMSHER JANG. **Production of Alkalinity by *B. pestis* in Broth and the Effect of this Alkalinity on the Toxicity and Potency of the Prophylactic.**—*Indian Jl. Med. Res.* 1927. Oct. Vol. 15. No. 2. pp. 335–341. With 1 chart in text. [6 refs.] [Haffkine Inst., Parel, Bombay.]

The growth of plague bacilli in broth results in production of alkali and cessation of growth. This cessation of growth is not due to exhaustion of nutrient elements, but is simply the effect of alkalinity, as can be shown by neutralization experiments. The alkalinity attains its maximum between the fifth and eleventh weeks and undergoes slight rise and fall thereafter up to the end of the incubation period, extending to 176 days. At the end of this time the organism is still viable. The amount of alkali present in the broth vaccine does not affect either its toxicity or its potency.

W. F. Harvey.

SEMIKOZ (T.). **The Apparatus for the Infection per inhalationem of Little Animals with Highly Pathogenic Microbes (*B. pestis*).**—*Rev. Microbiol. et Epidémiol.* 1927. Vol. 6. No. 3. English summary p. 382. [In Russian pp. 345–348. With 3 text figs. 2 refs.]

Three figures in the Russian text (p. 347) make clear the construction of the apparatus. The advantage of the proposed apparatus is that the animals having been subjected to the inhalation can be removed into the clean division when required. This can be accomplished without any risk to the experimenter with the aid of two rods: One opening and closing the doors between the divisions, the second removing the cage from the division, where the emulsion of *B. pestis* has been sprinkled, into the clean one where the animals are kept for a definite time.

J. H. T. W.

v. JETTMAR (H. M.). Beiträge zum Studium der Pest unter den Insekten. II. Mitteilung. **[Plague among Insects.]**—*Ztschr. f. Hyg. u. Infektionskr.* 1927. July 25. Vol. 107. No. 3-4. pp. 498–509. [17 refs.] [North Manchurian Plague Prevent. Service, Harbin.]

The author reviews the work of other investigators and gives results of his own experiments:—Cockroaches (*Blatta orientalis*) can live after feeding for more than a month on material containing *B. pestis* and their eggs produce healthy young. He was never able to infect guineapigs with fresh excrement from cockroaches fed on plague material. Inoculation of *B. pestis* into the coxa stump of an amputated leg did not produce any fatal signs of plague in cockroaches or in locusts; nor could locusts be infected by feeding.

J. H. T. W.

- DE SMIDT (F.). **The Problem of Plague and Protective Vaccines: a Semi-Technical Commentary.**—*Kenya & East African Med. Jl.* 1927. Oct. Vol. 4. No. 7. pp. 210–223. [9 refs.]

Most of this commentary is controversial and deals with the merits and demerits of an agar plague vaccine and the bouillon vaccine associated with the name of Haffkine. The Nairobi prophylactic vaccine is of a slightly modified Haffkine type.

W. F. Harvey.

- ABBATUCCI. La peste. Sa symptomatologie. Sa prophylaxie. Son traitement. —*Bruxelles-Méd.* 1927. Nov. 27. Vol. 8. No. 4. pp. 102–104. [2 refs.]

- CHOKSY (N. H.). A Post-Graduate Lecture on the Pathology of Plague.—*Indian Med. Gaz.* 1927. Sept. Vol. 62. No. 9. pp. 510–514. With 5 charts in text.

- GRUBBS (S. B.). Bubonic Plague and Maritime Quarantine. A Suggested System of Plague Control, assuming that there is Infectible and Non-infectible Territory, discussing the Cheopis Index as a Measure of Infectibility, and advocating the Rat-Proofing of Ships to prevent the Spread of Plague by Sea.—*Public Health Rep.* 1927. Aug. 12. Vol. 42. No. 32. pp. 2045–2056. [26 refs.]

- HIRST (L. Fabian). Rat-Flea Surveys and their Use as a Guide to Plague Preventive Measures.—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1927. Aug. 31. Vol. 21. No. 2. pp. 87–104. With 4 figs. (1 map). [10 refs.] [City Microb. Lab., Colombo, Ceylon.]

- MATOS (Emygdio). Peste.—*Archivos de Hyg.* Rio de Janeiro. 1927. May. Vol. 1. No. 1. pp. 125–143.

HEAT STROKE.

WAKEFIELD (E. G.) & HALL (W. W.). **Heat Injuries. A Preparatory Study for Experimental Heat-Stroke.**—*Jl. Amer. Med. Assoc.* 1927. July 9. Vol. 89. No. 2. pp. 92-95. With 1 text fig. [32 refs.]

The authors give a short history of heat stroke and certain tables from which they compile the following summary:—

"A study of the heat injuries as they have occurred in the United States Navy since 1861 shows that there have been thirty-eight deaths and forty-three invalided from the service.

"This study appears to indicate that the incidence of heat injuries is greater in those born and reared in the northern section of the country than it is in those from the South."

[v. this *Bulletin*, Vol. 23, p. 457 (*U.S. Nav. Med. Bull.*).]

J. H. Tull Walsh.

HALL (W. W.) & WAKEFIELD (E. G.). **A Study of Experimental Heat-Stroke.**—*Jl. Amer. Med. Assoc.* 1927. July 16. Vol. 89. No. 3. pp. 177-182. With 2 charts in text. [39 refs.] [U.S. Naval Med. School, Washington, D.C.]

The experimental dogs reacted with the clinical syndrome of heat exhaustion as well as that of thermic fever. The chemical observations of the blood and the pathological changes in tissue showed that there was great renal injury, evidenced by progressively increasing azotaemia. This nitrogen retention is obviously not a portion of the essential changes of the early, acute condition. Blood sugar increased in some cases, decreased in two cases and remained relatively constant in others. In most instances blood chlorides increased; the average showed increase of 26 mgm. per 100 cc. Alkali reserve, as recorded by plasma carbon dioxide, decreased markedly, going as low as 10.7 per cent. by volume in one case. Lactic acid content of the blood showed an average increase of 96.2 mgm. per 100 cc. The important acute pathologic change in major heatstroke is a massive increase in lactic acid with resulting acidosis. Serum pH decreased in seven cases observed. Total nitrogen and total solids did not demonstrate any significant change in blood concentration. Inorganic phosphorus of the serum was slightly increased and serum calcium showed increase. The pathologic changes were: rigid contraction of the left heart, venous congestion, contraction of the intestines and urinary bladder, dilatation of the stomach, and cloudy swelling and degeneration of the parenchymatous elements, particularly those of the glandular and nervous character. There was no reaction in the connective tissue except in the lungs in which interstitial oedema was present.

J. H. T. W.

DODD (Katharine) & WILKINSON (Scott J.). **External Heat a Cause of Fever in Children.**—*Jl. Amer. Med. Assoc.* 1927. Mar. 12. Vol. 88. No. 11. pp. 787-788. With 1 chart in text. [6 refs.]

The authors point out that external heat is not usually mentioned as a cause of obscure fever in children. Five infants whose fever was

definitely caused by external heat not only had fever but were restless and irritable. As soon as they were placed in a comparatively cool room with moving air, their temperatures became practically normal and they were quiet and contented. Coloured children were not similarly affected by the heat. An artificially cooled room, with good circulation of air should, if possible, be provided in Southern hospitals that care for sick infants.

J. H. T. W.

ALLEN (H.). **Heat-Stroke, and Heat-Syncope.**—*Vet. Jl.* 1927. Mar. Vol. 83. No. 3. pp. 120-122.

The cases referred to are those of heat-syncope occurring in horses at the Remount Depot at Mona in the Punjab. Pathological effects of high temperature are only evident when there is a marked amount of atmospheric humidity. In heat-stroke there is extremely high fever, and in heat-syncope symptoms of collapse and low bodily temperature are evident. The general symptoms in horses are loss of appetite for the first two days, progressive dullness and marked depression, drooping head, fixed eyes and dilated pupils, uncertain gait, respiration laboured and accelerated, nostrils dilated and in some cases epistaxis from one or both nostrils. The mortality is not stated. Over 40 blood smears were examined with negative results. All cases were placed in loose boxes with plenty of drinking water and liberal supply of green forage and bran. Enemata of cold water and cold applications to the cranial region were used. If high temperature (106-108°)* persisted for three days intravenous injections of hydrobromate of quinine (30 grains) were given. Some cases showed alarming symptoms of over stimulation and collapse after the injections, but resumed the normal in about half an hour. Hypodermic injections of camphorated oil were administered when cardiac stimulation was needed.

J. H. T. W.

* The average rectal temperature of the horse is 100.4°. (Veterinary Posology: Banham & Young).

REVIEWS AND NOTICES.

KNOWLES (Robert). [B.A. (Cantab.), M.R.C.S., L.R.C.P., Lt.-Col., Indian Medical Service, Fellow of the Asiatic Society of Bengal, Professor of Protozoology, Calcutta School of Tropical Medicine.] **An Introduction to Medical Protozoology with Chapters on the Spirochaetes and on Laboratory Methods.**—pp. xii+887. With 174 text figs. & 15 coloured plates. 1928. Calcutta: Thacker, Spink & Co. [£2. 1. 8 or Rs. 25.]

In his Preface the author of this work says that when he "first commenced to teach medical protozoology to post-graduate students at the Calcutta School of Tropical Medicine in 1921, one of his chief difficulties was the want of any suitable text-book in English on the subject. The information required was scattered throughout the chief medical [and he might have added zoological] research journals of the past twenty [he might well have said fifty] years, but it was nowhere collated into a good text-book in English, whilst the sections on protozoology in the text-books of tropical medicine of that date were scanty, sketchy, and for the most part inaccurate." [This is so true, and so feelingly expresses universal experience, that it inspires one with confidence to read on. The man who has felt this has our instant sympathy.] . . . "The writer therefore decided on the compilation of the present volume—intended primarily as a text-book for the students of the Calcutta School of Tropical Medicine, but also, he hopes, as a useful laboratory text-book for laboratory workers in India and elsewhere."

The resultant book's 887 pages are apportioned thus: Part I, "Lectures in Medical Protozoology," pp. 1-625 (19 lectures); Part II, "Laboratory Methods," pp. 627-769 (7 chapters); Part III, "References to Literature" [Why not "References" simply? Are not all references "to literature"?], pp. 771-862 (about 2,000 entries). There is a good index, also, of some 25 pages, and the text is illustrated by numerous Plates (mostly in colours) and an abundance of text-figures—many of which occupy a full page. All the Protozoa of medical interest are dealt with in detail, in systematic order, in Lectures I-XVI. Lectures XVII and XVIII are devoted to the Spirochaetes [now, unfortunately, tied by tradition to the Protozoa, though no competent worker any longer assigns them even to the Animal Kingdom]; while the final Lecture discusses "Diseases due to Rickettsia bodies" and "The Chlamydozoa as cell-inclusions," and ends with "Some notes on Rabies." Short sections on technical details (in Part II) have been contributed by R. SENIOR-WHITE and R. O. A. SMITH.

"The writer regrets that so little of this volume is original, and so much of it 'loot.' In the interests of his students he has unblushingly borrowed, stolen, and appropriated wholesale." The major part of this "looting" has been, avowedly, from WENYON'S *Protozoology* (1926), though the reviewer's works—especially those on intestinal protozoa—and PATTON and CRAGG'S *Medical Entomology* have also been freely drawn upon. Every accessible stream of information (including some which were probably inaccessible at their source) appears, indeed, to have been diverted to the author's purpose, and the confluent then filtered and bottled and neatly labelled for consumption by the student.

As it is obviously impossible, in the space available, to summarize a detailed and fully documented work of this magnitude, the reviewer will attempt to do no more than record his own general impressions and opinions.

Perhaps the strongest impression received, after perusal of the whole work, is a personal impression of the author—who strikes the keynote of his book in dedicating it not to some celebrated protozoological pundit, but to his tried and trusted Indian junior. He is so obviously sincere

and workmanlike, so eager to learn and to confess his sins, that it is difficult—if not impossible—to criticize him : and he is so modest and unassuming withal, that an ignorant or unwary reader might easily infer, from his words, that his personal contributions to this work have been but small. Yet this is by no means true. It required a good deal of originality and courage—not to mention knowledge and industry—to compile such a book in such a fashion ; and when it is remembered that the whole work was written in nine months—as the author himself tells us—and has been entirely made and printed in India, one can only marvel at the result. Few men now living could have made as good a job of it, and probably none could have done it better. In the opinion of the reviewer this is, indeed, the best book, taking it all round, that has yet been published on medical protozoology—in any language or in any land.

This is not to say that it is free from faults, for no book which attempts to survey so vast and varied a field ever could be. But the faults appear trivial in comparison with the merits. The author writes fluently and often colloquially—as befits the lecture-form in which his information is imparted—so that he is easy to read and understand. But he sometimes, in consequence, writes loosely (as, for example, when he says on p. 536 that "one spirochaete at least—*Spirillum minus*, the parasite of rat-bite fever—has a rigid structure and pre-formed coils" [distinctive characters of *Spirillum* as opposed to *Spirochaeta*]); and he frequently splits his infinitives. As the bulk of his writing is so clear and easily assimilable, however, it is unfair to emphasize minor blemishes. Moreover, many of his mistakes are not his own, but are copied from "authorities" in whom he put his trust. The reviewer, being one of these, can say this without prejudice. [He confesses, indeed, to feelings of considerable embarrassment on finding some of his own imperfect efforts referred to as "splendid"—and even "classical": for he is well aware that such exuberant epithets are properly applicable to very few publications in medical protozoology.] As might be expected, the author is most interesting and instructive when he speaks about things of which he has himself a good working knowledge, and about protozoa which have been objects of his own researches. Particular attention may be directed to the sections dealing with kala azar and rabies, which are both "original," and not mere compilations. His descriptions and figures are usually graphic and adequate, and his lapses—on the whole—infrequent. Occasionally, however, his words are too graphic: for example, when he speaks of *Arcella* as "bean-shaped" (p. 28). [It took the reviewer some seconds to realize that this entire misdescription is derived from pictures of this rhizopod in books, which often show it thus in optical section.] Almost invariably the author is least accurate when he wanders into non-medical protozoology; and here, occasionally, he becomes positively inaccurate. For instance, he says (p. 6) that "the Protozoa . . . leave no fossil remains": from which one can only conclude that he has never dug into the immense literature on fossil Foraminifera and Radiolaria [which date back to Precambrian times] or ever made a microscopic examination of the chalk with which he daily draws upon his blackboard.

On most subjects the author is well informed and up-to-date, and his judgement regarding recent matters still *sub judice* usually appears to be sound. This applies both to the "Lectures" and to the "Chapters" in the practical part. In the technical sections, however, the reviewer—from his own experience—frequently finds himself at variance with the author on points of detail. He is ready to prove, for instance, that "Schaudinn's Fixative" (p. 680)—called "the premier fixative for all film work" and "the fixative"—is not that of SCHAUDINN himself: that DOBELL has never employed an "alcoholic haematin stain" (p. 695)—being well aware that haematin is not an oxydation-product of haematoxylin, but a blood-pigment: and that the methods advocated for staining spirochaetes in bulk with silver (p. 702), and for imbedding insects or other chitinous objects (p. 737), are among the worst possible—since they

contravene fundamental principles in both processes. Misprints, also, are not infrequent; but for this the author may not be wholly to blame. Fig. 7 (p. 12) is printed upside-down; while *Paramecium* is invariably miscalled "*Paramæcium*," and several proper names—such as "Butschli" (for BÜTSCHLI) and "Boeck" (for БОЕЦК)—are misspelled throughout. It is annoying to see the name of one of the greatest of protozoologists repeatedly misprinted: but it is also against the Rules of Nomenclature to print the specific name of the *Iodamoeba* of man without its proper diacritic marks. Possibly these are somewhat pedantic criticisms, yet they involve questions of principle which are not negligible in a book of this character.

In judging such a book, one has to consider (1) whether its statements, in the main, are true rather than false; (2) whether its information is helpful or unhelpful; and (3) whether it is readable or unreadable. The reviewer has found the present work true, in the main (as far as his own limited knowledge enables him to judge), helpful, and readable; and he therefore commends it to all serious students of medical protozoology. It appears to him to be an honest and successful and consequently a praiseworthy attempt to advance the subject with which it deals; and as a fellow student—albeit with different aims and different interests—he therefore welcomes the book as a real addition to the literature. When he recalls the difficulties under which he himself laboured, when a very beginner, through lack of such a work, he envies the present-day student. Though so much less was known twenty-five years ago, it was then much harder to acquire the rudiments of medical protozoology than it is to-day.

The appearance of this book is, without doubt, an event of more than local interest. It marks a definite step in the advancement of its subject—not only from the purely scientific and medical, but also from the educational standpoint. It may—and the reviewer thinks and hopes that it will—even mark a turning-point in the teaching of medical protozoology everywhere, and the beginning of a new period of progress in the science itself. At all events, with this work at his disposal no student (or teacher) has any longer a good excuse for ignorance; and if further advances do not follow, it will not be Col. Knowles's fault. The Calcutta School is fortunate in possessing such a Professor of Protozoology, whose words deserve an audience much wider than the immediate circle of his Indian pupils. It is no exaggeration to say that if there were, among zoologists and medical men, a few more pupil-teachers of his stamp, the future of medical protozoology would already be assured.

Everyone interested in the Protozoa should buy or borrow this book—and read it. He will probably find at least one mis-statement on every page; but present-day protozoological science is full of mistakes, so that the work is not to be condemned for this reason. Rather is it to be praised for its general truth, and for setting errors in bold relief. Anyway, the reviewer can say with some confidence that, to his knowledge, no better introduction to medical protozoology has yet appeared in print.

Clifford Dobell.

SCHUBERG, (A.). Das gegenwärtige und frühere Vorkommen der Malaria und die Verbreitung der Anophelesmücken im Gebiete des Deutschen Reiches. [**The Occurrence of Malaria in Germany Now and in the Past and the Distribution of Anopheles.**]*—Arb. a. d. Reichsgesundheitsamt.* 1927. Nov. Vol. 59. No. 1-2. pp. 1-427. With 1 folding map & 3 figs.

During the course of the war of 1914-18, and for some time after it had come to an end, much anxiety was felt in Germany, as in other countries of Europe, lest the unusual conditions should lead to an outbreak among

the civil population of certain diseases which have always been associated with military operations. Former wars have often been responsible for epidemics of enteric, typhus, cholera, smallpox and other diseases, and it was reasonable to fear that the late war might be followed by similar results. No war had ever been waged on such a large scale and over such an extensive area; in Germany alone, over thirteen millions of men had been mobilized for military purposes, and land campaigns were conducted in many parts of three of the continents. There were many novel conditions, too, which made this war very different from all preceding ones. Hitherto the danger of wide-spread outbreak of malaria had scarcely occurred, and the remarkable and rapid decline in the prevalence of this disease in all the countries of North Western Europe would have allayed all anxiety on this score in normal circumstances. But the circumstances were not normal: on the enemy side, large numbers of white and coloured troops hastened to the European seat of war from many parts of the Tropics and sub-tropics, and it was certain that a considerable proportion of the men would come already infected with malaria. Many of them were living closely herded together in the inevitably insanitary conditions of active warfare; their powers of resistance to infection were lowered by the hardships to which they were exposed; the war was carried on in numerous swampy and inundated districts (Russian Poland, the Balkans, Asiatic Turkey, Flanders) where there was no lack of suitable mosquito carriers; and supervision was bound to be inadequate at a time when so many more urgent matters claimed the immediate attention of medical officers in the field, and of Public Health officials in Germany itself. It was well known that, even up to fifty years ago, malaria had been common in most of the areas concerned, and the fact that it had become practically extinct in many of them was to be attributed almost entirely to the greatly improved standards of personal hygiene and general sanitation; now, as the result of the conditions of warfare, these had reverted to a considerable extent to those of malarious times. It seemed natural, therefore, to fear that this disease, which had become almost unknown in the favourable conditions of peace, would now revive in the unfavourable conditions of war. The large numbers of prisoners of war in the camps scattered over Germany, and the certain presence among them of many malaria cases seemed to be an additional menace to the public health. Moreover, it was likely that the advent of peace, with the return to Germany from abroad of many interned German citizens and prisoners, and the demobilization of large numbers of men from the various theatres of war would only bring new dangers with it. As regards the army, the fear of a considerable increase of malaria was well founded; after venereal diseases, malaria was indeed the greatest scourge among the armies in the field; but, although the number of indigenous cases of malaria among the civil population was certainly larger than it had been before the war, the anticipation of an outbreak on a large scale has not been realized.

The consideration of these facts led Dr. A. Schuberg to undertake the task of comparing the present prevalence of malaria in Germany with that of former times. In this book he quotes many old records from all the provinces of Germany, and he has made a very thorough study of the literature of the subject. Naturally, in the days before the discovery of the malarial parasites and of the mode of transmission of the disease, there are many cases in old reports of which the diagnosis must remain uncertain; but, although absolute proof is lacking, the diagnosis of careful clinicians cannot be set aside lightly. As in England and France, so too in Germany, there is no doubt whatever that ague was formerly extremely prevalent in many places whence it has now entirely disappeared. For actual figures of the years before LAVERAN'S discovery, the author has had to depend upon admittedly imperfect records, but the statistics for the army and other tables that he gives show very clearly indeed that malaria, which was very common in certain Army Corps and among the civil population of some districts, is not met with now. Even the statistics of the present

day can only give an approximation to the truth, since malaria is compulsorily notifiable in only a few districts, and many mild clinical cases are undoubtedly not reported at all.

The factors concerned in the disappearance of malaria are discussed under the following heads: (1) Drainage of the Soil; (2) Domestic Hygiene; (3) The Use of Quinine; (4) Improved Housing of Cattle; (5) Destruction of Mosquitoes. Dr. Schuberg appears to attach much importance to the use of quinine, and quotes R. KOCH (1900) and PFEIFFER (1901), who considered that the great decline of malaria in Germany was chiefly due to the cheapness and general use of this drug; almost the same opinion was held by MUHLENS (1911) and LAUTERBORN (1917). No doubt in many places the habitual use of quinine has been a contributory factor in the great decline of malaria, but the same decline has been just as marked where quinine has played no part, or, at most, a very subordinate one. Romney Marsh, in England, is a case in point. Here ague was formerly very common indeed; nowadays, although *Anopheles maculipennis* is found in this district in very large numbers, and there must be plenty of individuals among the soldiers at Hythe, Lydd, Shorncliffe and elsewhere, who have acquired malaria abroad, and who still harbour the parasites in their blood, there is no malaria. The author himself quotes KROLL (1908) and MARTINI (1920), who give instances of the extinction of malaria in Germany without the use of quinine.

So much has been written of late years about the causes of the practical disappearance of malaria in North Western Europe that it is unnecessary to go further into the matter now.

During the four years of the war, Dr. Schuberg estimates that considerably more than a quarter of a million cases of malaria, acquired abroad, returned to Germany; and he considers it a reasonable assumption that at the end of the war, among every thousand of the total population, there were from one to four malaria carriers. Nowhere was there any increase of malaria of importance, nor were any new centres of infection established in Germany after the war.

The only district in which there was a definite increase of malaria is Aurich, in the province of Hanover; but, even here, the increase is probably only an apparent one, as the statistics of former years were almost certainly underestimates of the real prevalence of the disease. It is very likely, too, that the interruption of preventive measures, owing to war conditions, was a contributory cause of the increase, if such actually occurred. At any rate, there is no direct evidence that the increase of malaria in this district was due to the introduction of infected cases from without; Malaria has always been endemic in Aurich, especially in the country round Wilhelmshaven and Emden. The records of malaria here go back for at least a hundred years. Thus, in 1826 there were "several thousands suffering from malaria." As elsewhere, the amount of malaria fluctuated from year to year, though, on the whole, there has been a considerable decline. Moderately severe epidemics occurred in 1906 and 1907; in 1913, 113 cases were notified, and in 1914, from the 15th March to the 31st August, there were 90 new cases. During the years of the war the numbers increased to 252 in six months of 1915, 434 in eight months of 1916, and 953 in seven months of 1917. There is some confusion about the figures for 1918, but at least 4,760 cases of malaria occurred of which only 182 were soldiers and 84 prisoners of war, the great bulk of the cases being among civilians; in 1919 there were about 4,000 cases. After this year there has been a rapid decline, with, however, the usual fluctuations. In 1920 only 126 cases are recorded, but there was an increase up to 655 cases in 1926.

The distribution of the species of *Anopheles* in Germany, as far as it is known for certain, is given by Dr. Schuberg; it includes practically the whole of Germany, though, of course, the prevalence varies in different parts of the country.

The author must be congratulated on this useful book, the writing of which must have been a very laborious task; he has replaced by definite facts what were formerly, in many cases, merely general impressions or vague surmises.

There is a very complete bibliography, which naturally, owing to the subject, is almost confined to German publications.

H. J. Walton.

ROGERS (Leonard). [C.I.E., M.D., B.S. (Lond.), F.R.C.P., F.R.C.S., F.R.S., I.M.S. Ret., Physician & Lecturer, London School of Tropical Medicine, etc.] **Recent Advances in Tropical Medicine.**—pp. viii + 398. With 12 illustrations. 1928. London: J. & A. Churchill, 40 Gloucester Place, Portman Square, W. 1. [12s. 6d.]

There will be universal agreement that Tropical Medicine is not now making such strides as it did two or three decades ago; yet much detailed work is reported yearly from widely scattered parts of the world. Apposite critical abstracts of these reports appear in the *Tropical Diseases Bulletin*. The author acknowledges this boon to the vast majority of practitioners in the tropics situated far from libraries; and his own indebtedness to that *Bulletin* for much of the information in the present work. His historical paragraphs are interesting and evidently prepared with care, and he has summarized in very readable manner his selection of what he has judged to be the more important of recent work on leishmaniasis, malaria, trypanosomiasis, relapsing fever, yellow fever, dengue and phlebotomus fever, tick fever, undulant fever, plague, cholera, dysentery, amoebiasis, sprue, ankylostomiasis, schistomiasis, filariasis, leprosy, yaws, beriberi and pellagra. Special attention has been given to treatment, and there are twelve excellent illustrations. In some of these diseases the author has laid us all under real obligation for more accurate understanding of their nature and process and more effective remedy of their ills. It is not to be expected, however, that there will be universal agreement that all of his selections from recent work constitute advance in our knowledge, nor that all of his omissions are not advances.

H. M. Hanschell.

SEVENTH CONGRESS OF THE FAR EASTERN ASSOCIATION OF TROPICAL MEDICINE. **Souvenir. The Indian Empire. Being a Brief Description of the Chief Features of India and its Medical and Sanitary Problems.**—pp. vii + 346. With 20 plates & 4 maps (1 folding in pocket). 1927. Printed by Thacker's Directories Ltd., 6, Mango Lane, Calcutta, and published by the Executive Committee of the Congress.

This book will serve not only as a souvenir for those who attended the Congress but, also, as a guide book and work of reference for residents in, and visitors to, the Indian Empire. It certainly adds one more to the list of useful books on India mentioned in the Appendix. The information is necessarily condensed and cannot be reviewed at length; but the reader will find chapters on the physical features, population, scenery and places of special historical or archaeological interest, agriculture and the history of India from ancient times. Medical, sanitary and veterinary research are dealt with and the book contains short sections recording the site and work of the numerous hospitals and research institutes in the Empire. The weather receives attention and there are special articles on racial ethnology, zoology, botany and geology. The photographic illustrations are very good and there is an excellent map in the pocket of the book. The editor and his colleagues can be congratulated on the amount of information they have packed into 346 pages.

J. H. Tull Walsh.

NATIONAL MEDICAL ASSOCIATION OF CHINA. **Medical Guide. Issued on the Occasion of the Seventh Biennial Conference Jan. 27th to Feb. 2nd, 1928, Peking.**—118 pp. With 1 map & 10 plates. 1928. Peking: Printed by the Commercial Press, Ltd.

The Publication Committee of this brochure, published in Chinese and English with many illustrations, write that with the development and progress of modern medicine in China there is need for a directory of medical institutions and practitioners; they have therefore collected the available data and have added a list of supplies of medical apparatus, so that we have a medical directory and buyer's guide in one volume. Several pages are occupied by an account of the medical institutions in Peking, which appears to contain no less than 16 hospitals and dispensaries. There are descriptions of the National Epidemic Prevention Bureau and the Peking Union Medical College, reorganized some years ago by the China Medical Board of the Rockefeller Foundation. The account of the other medical institutions in China is less detailed.

A. G. B.

TROPICAL DISEASES BULLETIN.

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[No. 5

SLEEPING SICKNESS.

DYE (William H.). **The Relative Importance of Man and Beast in Human Trypanosomiasis.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1927. Nov. 25. Vol. 21. No. 3. pp. 187-198. With 3 maps. Also in *Jl. Roy. Army Med. Corps.* 1928. Mar. Vol. 50. No. 3. pp. 184-195. With 3 maps.

During the last twenty-two months the author has had under observation in the south-eastern part of Tanganyika a small outbreak of sleeping sickness due to *T. rhodesiense* and spread by *G. morsitans*, which, owing to its limited scope, and the fact that the inhabitants were not allowed to leave the area, gave certain opportunities for observation. According to native tradition, the area in question, which is situated in the Liwale Valley close to its junction with the Matandu, has a sinister reputation.

In December, 1924, sleeping sickness appeared in the village of Namabao and by March, 1925, 42 deaths had occurred and 24 cases of the disease were found. The survivors, both sick and healthy, were removed later and segregated in a fly-free camp. This village had stood for 2½ years in a densely infested fly area without apparently an abnormal death rate. It consisted of two groups of houses and no attempt was made to clear the bush, which grew up to, and between the houses, and was swarming with fly.

Another village, Kiringulla, about ten miles further south, had been in existence for a number of years and was on a favourable site and surrounded by gardens. This village escaped to a very great extent, although the surrounding bush was heavily infested with fly. Ten miles further south lies another village, Ali Kuperwiro, which has been in existence for 2½ years and in all respects resembles Namabao.

The author finds certain points of interest in this state of affairs. Firstly, the exemption from disease of Kiringulla, although situated midway between two badly infested villages. Secondly, Namabao for a period of 2½ years was free from disease, although all conditions of fly, game, etc., must have been constant and sleeping sickness was present in this part of Tanganyika. This the author considers to be highly suggestive of the introduction of an infective agent about 2½ years after occupation of the village. Thirdly, as is shown in a map of the whole area, the number of cases per individual village appears to depend on the freedom, or otherwise, of the village from fly, the distribution of fly in the surrounding bush having no influence on

the sickness rate. The inhabitants of all villages were equally exposed to the bites of tsetse in the bush, but not to those of flies haunting the villages. This suggests that whatever the original cause of the outbreak the infection is spread from man to man and not from game to man. Many individual cases were investigated in the hope of determining the mode of infection, but with little success.

An interesting experiment was performed at Namabao. Two months after the population had been removed, the healthy survivors were allowed to return. The village had deteriorated, all paths were much overgrown, the bush was evident between and about the huts, spoor of game of all sorts lay everywhere, and elephants had pushed off roofs in search of food; the presence of fly could not be ignored. Although they remained in the village for 2½ months and were kept under observation for 20 months afterwards none of these survivors developed sleeping sickness. The author concludes that by removing the human source of the infection the site again became healthy and safe for habitation. Details are given of a number of cases in which it appears that infection was definitely transmitted by local village tsetse from man to man.

At the end of 1926, and the beginning of 1927, two small recrudescences of the disease took place. By this time the country was intimately known and the inhabitants had been listed. As the quarantine was still in force, it was possible to check accurately and periodically all the inhabitants. Details of these recrudescences convince the author that it is difficult to associate the distribution with any but man to man infection. The article concludes with certain recommendations regarding preventive measures.

W. Yorke.

CARPENTER (G. D. Hale). **Annual Report on Sleeping Sickness for 1926.**

—*Uganda Protectorate Ann. Med. & San. Rep. for the Year ended 31st December, 1926.* Appendix No. II. pp. 64–71.

In this report Carpenter summarizes the position at that date in the various infected areas in Uganda.

The Victoria Nyanza Infected Area.—Little has been done in the way of dealing with the numerous irregularities and undesirable encroachments, and much progress will be impossible without adequate staff. FISKE has proposed that there should be distinction between "safe," and "dangerous" or "doubtful," areas. In the former no restrictions will be necessary, but in the latter occupation would only be permitted so long as no infection was found, or until the medical authorities considered evacuation necessary. This proposal was finally agreed to. In order to test the working of this scheme Carpenter examined the coast of Busiro Saza from Entebbe to the Kyadondo boundary, marking out a danger line as he went. Encroachment was found to have taken place on a very large scale, uncleared watering and landing places were in use and plantations were being opened up in the forest belt on the coast. In the Sese Islands it is reported that all landing places had been inspected, and while twenty required more attention, the majority were found to be satisfactory. Many of the private estates were, however, fly infested. At Koja, where it is desired to establish a Government stock farm, it was decided that, provided certain clearings were made, the peninsula could be re-opened

for this purpose. No fishermen have yet been found infected except in the Mjanji area, but infection has been introduced on the Kyadondo coast near Kampala.

The Victoria Nile, Jinja-Kakindu Area.—The present state of affairs in this area is practically unknown, as it has not been possible to tour it or to make any other recommendations than those put forward in 1922, which in 1923 were found not to have been carried out.

The Mpologoma Area.—It was not found possible to tour this area in 1926, but Dr. VAN HOOFF reported that the disease seemed to be actually arrested. The native inspector examined the population along the Busoga bank, but found no cases of the disease.

The Busitema Area.—Dr. VAN HOOFF reported that there is still active trypanosomiasis in this area, and that the majority of cases are old men and children charged with the care of cattle.

The Siroko Valley Area.—This area has not been visited. So far as is known the *Glossina* is still uninfected.

The Katwe Area.—The part in the Toro district has been inspected several times during the year and administrative measures have been planned, which should materially reduce the risk resulting from the movements of natives in the Belgian Congo and the conditions under which the salt traffic is carried on. Carpenter believes that the cases found at Katwe had undoubtedly contracted infection in the Congo or in the frontier country. The part of the area in Ankole district is healthy and no case of sleeping sickness has been discovered. The portion in the Kigezi district has not been visited.

The Wasa River Area.—Apart from the road to Ntoroko Port, this is intended to be uninhabited and unoccupied. A wholesale disregard of sleeping sickness regulations was found to be occurring.

The Bwamba Area.—The position here appears to be more satisfactory. The area was toured in September, and it was found that recent cases of sleeping sickness had either been formerly resident in the closed part of the area, or, in a few instances, came from the Congo.

The Buganda Lake Albert Area.—This is uninhabited and has not been visited.

The Bunyoro Area.—The area was visited and no cases were found.

The Nile Area.—The part in the West Nile district has not been toured, but no deaths from sleeping sickness were reported.

a. *The Acholi Area.*—It was not found possible to tour this area in 1926, but a medical officer was stationed at Gulu for part of the year. Of the sixty deaths reported, seven only occurred in counties other than Keyo. The people around Keyo were removed in 1924 from the dangerous old road along the Oiteno and Unyama valleys and it is still possible that the deaths are due to former infection.

b. *The Madi Area.*—It was impossible to visit this area during the year. The estimated population shows a distinct increase which the author thinks may justly be ascribed to efforts made to attack sleeping sickness. The death rate in Madi during 1926 from sleeping sickness was 2 per 1,000.

It was not found possible to tour the part of the area in the Chua district, but the Medical Officer was at Kitgum for part of the year, and the Sub-Assistant Surgeon toured the road from Kitgum to the Assua River and found no cases of sleeping sickness among the population of that area. Later, the district Medical Officer toured the south-

eastern part of the district and found no cases. The clearings are reported to be satisfactory. Towards the end of the year four cases were reported by the Sub-Assistant Surgeon.

W. Y.

LEDENTU (G.) & VAUCÉL (M.). Sur la valeur comparée de la réaction de Gaté et de l'auto-agglutination des hématies, comme signes de présomption de la maladie du sommeil. [**Comparative Value of Formol-Gel Reaction and Auto-Agglutination of Red Cells in Diagnosis of Trypanosomiasis.**—*Bull. Soc. Path. Exot.* 1927. Oct. 12. Vol. 20. No. 8. pp. 737-741. [2 refs.] [Pasteur Inst., Brazzaville.]

The only means of diagnosing trypanosomiasis with certainty is by discovering the parasite, but this is, in not a small proportion of cases, a very difficult matter. Consequently, it is desirable to discover another test for the infection. The only tests which appear to be of any real use are autoagglutination of the red cells and the formol-gel reaction, and it is the object of the present paper to compare the relative value of the two.

Among 74 untreated cases of trypanosomiasis agglutination never failed; on 21 occasions the reaction was strong, on 39 moderate, and on 14 feeble. The reaction of Gaté (formol-gel) was examined on the same 74 cases and gave practically the same result; where autoagglutination was marked the formol-gel reaction was rapid and *vice versa*.

The existence of the two phenomena was then investigated among 96 apparently healthy persons; some of these were undoubtedly free from the disease, but in others—the more numerous—the occurrence of enlarged glands gave rise to suspicion that possibly they were really infected, although all efforts to discover parasites had failed. In these 96 an absence of autoagglutination was noted 26 times, i.e., in 27 per cent. The absence of autoagglutination was always accompanied by a negative formol-gel test. In 34 of the 70 positive cases the autoagglutination reaction was strong and in 36 it was feeble. On the contrary, among these 70 cases the formol-gel reaction was positive only 23 times.

These figures suggest that the autoagglutination phenomenon gave 73 per cent. of errors as compared with 27 per cent. in the case of the formol-gel test. But it is possible that some of these cases were actually infected, and consequently the above figures representing the errors are too high.

The general conclusions are that in all cases of trypanosomiasis in which parasites are found, the autoagglutination and formol-gel reactions are positive and parallel; the absence of autoagglutination always coincides with a negative formol-gel reaction and this permits one to exclude trypanosomiasis. In cases where trypanosomes have not been found, a rapid formol-gel reaction is much less frequent than autoagglutination, and consequently it is to be presumed that the former has the greater diagnostic value.

W. Y.

LEDENTU (G.) & VAUCEL (M.). La réaction du benjoin colloïdal dans la trypanosomiase humaine. [**Colloidal Benzoin Reaction in Human Trypanosomiasis.**]*—Bull. Soc. Path. Exot.* 1927. Nov. 9. Vol. 20. No. 9. pp. 865–875. [Pasteur Inst., Brazzaville.]

The conclusions are :—

1. The colloidal benzoin test, limited to 5 tubes, does not give results of interest with the cerebrospinal fluid of patients infected with trypanosomes. Flocculation is the rule in all cerebrospinal fluids with hyperalbuminosis or hyperlymphocytosis.

The Bordet-Wassermann reaction was not performed in these positive liquids. But it is difficult to believe that a syphilitic meningitis was present in the absence of any specific symptoms.

2. The complete reaction with 16 tubes is of little interest from the diagnostic point of view ; the presence of the trypanosomes, the result of lumbar puncture and the symptomatology furnish obvious information.

It may, on the contrary, be of great service in prognosis.

(a) To a profound damage of the nervous system, sometimes not indicated by the clinical state and the immediate results of lumbar puncture (hyperlymphocytosis and hyperalbuminosis), corresponds a flocculation reaction affecting the 'meningitic zone.'

This slight 'paralytic reaction' is the rule in the mental troubles, tics, and somnolence of non-treated individuals. Its occurrence permits the conclusion that the nervous system is invaded in individuals who are not complaining of any trouble and whose spinal fluid is but slightly altered.

(b) After treatment, and even in the absence of clinical signs and modifications of the spinal fluid, the flocculation of the 'meningitic zone' is an indication for the continuation of treatment or prolonged observation of the patient.

(c) Coinciding with a grave alteration of the spinal fluid in patients whose general state appeared satisfactory, it seems to allow of the differentiation of the arsenical reactions from those due to the evolution of the disease after cessation of treatment.

(d) Treatment reduces the reaction towards the left. The persistence of the flocculation in the syphilitic zone only indicates an amelioration in the state of the nervous system and is a favourable prognostic sign.

(e) The colloidal benzoin reaction, definitely negative, is an indication which, when added to the other signs, suggests cure.

W. Y.

FISCHER (Otto). Beobachtungen an einem Fall von afrikanischer Schlafkrankheit. [**A Case of African Sleeping Sickness.**]*—Abhandl. a.d. Gebiet d. Auslandskunde. Hamburg. Univ.* 1927. Vol. 26. (D. Med. & Vet. Vol. 2.) [Festschrift NOCHT.] pp. 98–102. [Inst. for Ship & Trop. Diseases, Hamburg.]

Details are given of a case of sleeping sickness—a man 25 years of age who contracted the disease in the English portion of the former German Colony, Cameroons. The case is of interest on account of the extraordinary difficulty of treatment. Notwithstanding several administrations of "Bayer 205" in considerable doses relapses could not be prevented. Although it is now seven months since the last relapse, it is impossible to be certain that the patient is actually cured, but the decrease in the mononuclear count since the last febrile disturbance may be regarded as an indication of cure. Even if a further relapse should occur, the prognosis could still be regarded as favourable.

The cause of the resistance exhibited by this case to treatment is obscure. Most probably it was due to an insensitiveness of the parasites to the drug. Possibly this was the result of the adoption at first of KLEINE's scheme of

administering "Bayer 205" viz., one gramme on each of the first, third, tenth, and eighteenth days—a procedure which, owing to the rather lengthy intervals, gave the parasite the opportunity of becoming drug resistant.

In an addendum it is noted that the patient relapsed again after this paper was published.

W. Y.

CONNELL (W. K.). **A Case of Sleeping Sickness with Some Unusual Features.**—*Tanganyika Territory Ann. Med. & San. Rep. for the Year ending 31st December, 1926.* pp. 112–113.

An account is given of a case of sleeping sickness which presented a number of points of especial interest; these are:—

(1) The fact of the disease *starting* with somnolence and progressing to insomnia.

(2) The unusually large number of parasites—sometimes as many as 3 or 4 in an oil immersion field.

(3) The development of wrist-drop (which disappeared under treatment) and of deltoid paralysis (which persisted in spite of treatment).

(4) The wonderful improvement, even if it should prove to be only temporary, brought about by "Bayer 205."

(5) The fact that no albuminuria appeared throughout the course of Bayer treatment.

W. Y.

VAN DEN BRANDEN (F.). *Seconde note préliminaire sur des essais d'administration de Bayer 205 prophylactique à des agglomérations indigènes. [Prophylactic Trials of Bayer 205 in Native Villages.]—Ann. Soc. Belge de Méd. Trop. 1927. Nov. Vol. 7. No. 2. pp. 147–149.*

Following the trial of "Bayer 205" as a prophylactic made by the author at Biza in 1923 [this *Bulletin*, Vol. 23, p. 423] further similar tests have been made at Mikunga and at Masina. The general procedure was the same. The infected cases were treated in the ordinary manner; the healthy adults were given two injections of the drug each of 1 gm., the young people two injections of 0.5 gm., the children two of 0.25 gm., and the sucklings two of 0.1 gm. each. The injections were made at an interval of 2 to 3 weeks. Before the experiment the inhabitants of each village were subjected to two examinations, the first at the beginning of the first half of 1925, and the second at the beginning of the second half of the same year. The result of the examination is shown in a table.

Six months after the prophylactic treatment the people were re-examined. At Mikunga no new case was discovered and at Masina only one and he was absent from the village at the time the injections were given and so escaped the injections.

During 1926 two further re-examinations were made—one during each half of the year. At Mikunga one case was discovered during the first of these examinations, but he had not had the prophylactic injections, and two cases during the second of the examinations, and these had come to Mikunga from another infected village. At Masina a case was found among those who had received the prophylactic injections; the changes in his spinal fluid, however, gave reason to believe that he was really infected when he had the injections.

Thus before the prophylactic injections 17 cases were found, and at the examinations afterwards only 3 cases. It is noted that these two villages have been regularly visited since 1920, and the sick treated with a prolonged course of sodium-emetic; and it is inferred that the diminution in the percentage of infected is to be attributed to the prophylactic injections of Bayer 205.

W. Y.

LEDENTU (G.). Quelques résultats éloignés du traitement de la maladie du sommeil par la tryparsamide. [**Late Results of Treatment of Sleeping Sickness by Tryparsamide.**]—*Ann. Inst. Pasteur.* 1927. Sept. Vol. 41. No. 9. pp. 982-1001. [2 refs.] [Pasteur Inst., Brazzaville, French Equat. Africa.]

This paper gives information regarding the later history of a number of the 130 cases of sleeping sickness treated with tryparsamide at the Pasteur Institute of Brazzaville during the period November, 1925, to October, 1925. Most of the cases have already been reported before by LAIGRET [this *Bulletin*, Vol. 23, p. 425 and p. 900].

The majority of the cases dealt with in this paper have been under observation for between 1½ and 2 years. Of the 130 some have died either from sleeping sickness or intercurrent disease, and others have ceased to report, probably because they are now enjoying good health. The remaining 64 are considered here. The cases are grouped into the same 4 categories, according to their clinical and pathological state when treated, as in LAIGRET's report, and details regarding the results obtained in the cases falling into each group are given.

1. At the beginning of the second stage.—This group contained only 4 cases and of these 2 are apparently cured after an observation period of 13 and 18 months, respectively; and 2 have relapsed with parasites in their blood.

2. Second stage with apparent preservation of health.—Of this group 28 cases have been followed up: 23 have remained apparently cured for more than a year; 2 were improved by a first course of treatment and apparently cured by a second; and 3 relapsed, possibly owing to previous atoxyl or possibly owing to the insufficient intensity of the first course of tryparsamide.

3. Advanced second stage.—Of the 24 cases falling into this group 13 are apparently cured, 2 have improved and 9 have relapsed.

4. Terminal stage.—In this group there are six successes, 1 improvement and 1 dead.

The author's conclusions are as follow:—

The treatment by tryparsamide of patients in the second stage of sleeping sickness has given a very high percentage of cures: 62·5 per cent. have had no further treatment for periods varying from 9 to 24 months.

This success has been obtained with relatively small doses of the drug—about 25 gm. for an adult of 50 kilos.

Previous administration of atoxyl does not interfere with the action of tryparsamide. The arsenic resistance created by it is but slight; on the contrary, however, an ineffectual course of tryparsamide provokes very definite arsenic resistance.

In some cases good results were obtained by a mixed treatment.

Previous atoxylization increases the chance of ocular disturbances

and the author believes that the dose of tryparsamide in these cases should be reduced to the extent of 0.015 gm. per kilo. of body weight.

The relapses, which number 18.7 per cent., are in general considered to be the result of insufficient treatment.

W. Y.

LEDENTU (G.) & VAUCEL (M.). Nouveaux essais de traitement de la maladie du sommeil par la tryparsamide. [**New Trials of Treatment of Sleeping Sickness by Tryparsamide.**]—*Ann. Inst. Pasteur*. 1927. Nov. Vol. 41. No. 11. pp. 1200–1232. [2 refs.] [Pasteur Inst., Brazzaville.]

This paper records the immediate results obtained in the treatment of cases of sleeping sickness by tryparsamide in 1926, and also of a number treated in 1925, which were for various reasons not referred to in the authors' earlier publication [see previous summary]. It is hoped to record later the ultimate result of the treatment of these patients.

The cases are grouped into the following five categories according to the plan adopted by LAIGRET [this *Bulletin*, Vol. 23, p. 900]:—

(1) First stage; (2) at the beginning of the second stage, the spinal fluid containing not more than 70 lymphocytes per cmm. and 0.5 gm. of albumin per litre; (3) second stage with apparent preservation of health, the spinal fluid being profoundly altered without clinical signs; (4) advanced second stage with clinical symptoms; and (5) terminal stage.

The results of the treatment of each of these groups are recorded in detail and are summarized in tables.

The following are the conclusions:—

The results obtained in the treatment by tryparsamide of 165 patients in various stages of the disease recorded in this paper are not final since the observation after the cessation of treatment did not, on the average, exceed five months.

1. In the first stage when lumbar puncture did not reveal any involvement of the central nervous system the treatment by tryparsamide was not impressive; 12 per cent. of relapses were recorded; moreover, it was noticed in more advanced periods of the disease that the trypanosomes reappear in the blood after the administration of considerable doses of the drug (0.5–0.6 gm. per kilo of body weight). It has not yet been possible to establish that the treatment at this stage of the disease prevents the invasion of the nervous system.

2. So soon as the invasion of the nervous system is proved by lumbar puncture treatment by tryparsamide is truly impressive. For the patients of the first and second categories of this stage the successes obtained were respectively 86.5 and 73.0 per cent. of those treated. A previous course of treatment by another arsenical preparation in no way mitigated the beneficial action of tryparsamide.

Even in the advanced stage 53 per cent. of successes, and 15.62 per cent. of amelioration were obtained; these results are most encouraging. In the terminal stage the successes were not more than 23 per cent., but it must be remarked that many of the cases were moribund when treated and all other remedies had failed. Sensational results may be obtained with patients in this stage of such a nature as to appeal vividly to the imagination of the natives.

3. In all the authors' cases the drug was injected in series graduated between 0.02 and 0.055 gm. per kilo. of body weight. The intercalary period between the series was, as a rule, 45 days.

The evolution of the disease has shown that only those patients are benefited greatly by the treatment who were improved considerably by the first series of injections, which rarely exceeded 0.25 to 0.30 gm. per kilo.

Where first control lumbar punctures revealed only a slight modification or an amelioration which was transient, the prognosis has always been poor. The repetition of the cures has only ameliorated cases of this class with great difficulty.

In some cases the third and fourth series has been followed by a hyperlymphocytosis or hyperalbuminosis, indicating often a veritable "coup de fouet" but coinciding sometimes with such a conservation of the general condition as to make one think of a true meningeal reaction without further evolution of the trypanosomiasis.

This method of giving the drug in series of injections has enabled one to avoid ocular accidents, which have only occurred in 5 per cent. of the patients and have in general been mild.

4. The success thus obtained by the injection of the first series of the drug and with relatively moderate doses, caused the authors to think that it would be of interest to prolong the treatment beyond 6 or 7 injections, but to limit the injections to the smaller doses. Observations on this point are now in progress.

5. Treatment by tryparsamide allows one to hope for the definite cure of a large number of patients.

The necessity of prolonged observation with periodic blood centrifugings and lumbar punctures renders its application difficult by travelling units without specially equipped dispensaries.

W. Y.

LEDENTU (G.) & VAUCÉL (M.). Contribution aux essais du traitement de la trypanosomiasse humaine par le "Tryponarsyl" (paraglycinamidephénylarsinate de soude). [**Trial Treatment of Human Trypanosomiasis by Tryponarsyl.**]—*Bull. Soc. Path. Exot.* 1927. Nov. 9. Vol. 20. No. 9. pp. 875-883. [Pasteur Inst., Brazzaville.]

The simultaneous experimentation with tryparsamide and "Fourneau 270" has only allowed 25 cases of sleeping sickness to be treated with "Tryponarsyl" at the Pasteur Institute of Brazzaville.

The following are the conclusions:—

1. Twenty-five cases of sleeping sickness have been treated with "Tryponarsyl."

2. Four cases in the first stage of the disease were all successfully treated and had not relapsed within 5 months. Among those in the second stage the results are particularly interesting in the patients of the second and third category (those with well-marked nervous signs). Thirteen such cases were treated with 9 successes, 1 amelioration, 2 failures and 1 death.

3. The drug has been given intravenously at weekly intervals. Generally speaking the medication has been perfectly tolerated. The initial doses given were .035 gm. and the final doses .08 to .09 gm. per kilo.

Four patients suffered from ocular disturbances, which in three cases were limited to temporary amblyopia which disappeared on cessation of treatment.

4. The failures all appeared to be due to premature cessation of treatment allowing the hyperalbuminosis of the spinal fluid to persist; the doses were either insufficient or treatment had to be stopped on account of eye troubles. Further treatment is then powerless to arrest the disease. The same conclusions have been reached in regard to tryparsamide.

5. The feeble toxicity of "Tryponarsyl" makes it a very interesting drug and allows of the administration of prolonged courses, which appear at the moment the best treatment for sleeping sickness.

W. Y.

VAN DEN BRANDEN (F.). Essais de traitement de la trypanosomiase humaine chronique par le "270" Fournéau. Note préliminaire. **Trial Treatments of Chronic Human Trypanosomiasis by 270 Fournéau.**—*Ann. Soc. Belge de Méd. Trop.* 1927. Nov. Vol. 7. No. 2. pp. 99-109. [Leopoldville Lab., Belgian Congo.]

The drug "270 Fournéau" is the sodium salt of acetyl-p-amino-oxyphenyl-arsenic acid; it is a greyish white powder readily soluble in water. The author administered it intravenously as a 20 per cent. solution in distilled water, but it can also be given subcutaneously.

Fourteen patients were treated; one disappeared after having received a single dose of 1.5 gm. Repeated gland punctures at short intervals showed that the drug has a marked trypanocidal action; peripheral sterilization is produced in adults of from 45 to 60 kilogrammes within one or two hours by an intravenous injection of 1.5 to 2 gm. The duration of the peripheral sterilization produced by a single dose of the drug was not investigated, the author concerning himself practically entirely with the action in chronic cases.

Examination of the spinal fluid of the 14 patients treated showed a lymphocytosis varying from 6.8 to 2,080 per cmm. Owing to the limited quantity of drug available the patients received altogether from 15 to 28.5 gm. in weekly doses of 1 gm., 1.5 gm., or 2 gm. The results are comparable with those obtained with tryparsamide. No blood relapse was observed and most of the patients put on weight. Clinical details of each of the 14 cases are given.

W. Y.

LEDENTU (G.) & VAUCEL (M.). Note complémentaire sur le "270" Fournéau en trypanosomiase humaine. Résultats en fin août 1927. **Further Note on 270 Fournéau in Human Trypanosomiasis.**—*Ann. Inst. Pasteur.* 1927. Nov. Vol. 41. No. 11. pp. 1233-1242. [1 ref.] [Pasteur Inst., Brazzaville.]

The drug preparation "270 Fournéau" has been tested on a considerable number of patients at Brazzaville and, although it is as yet too early to form a final judgment regarding its action, the present note draws attention to the duration and validity of the apparent cures obtained.

Two orders of results are envisaged:—

A. Old patients treated from November, 1925, to May, 1926, and forming the subject of a previous article [this *Bulletin*, Vol. 24, p. 565].

B. New patients treated from May to September, 1926. The patients comprising each of these two groups are divided according to whether they were in the first or second stage of the disease and the results are described in detail and summarized in tables.

The following are the conclusions:—

1. The preparation "270 Fournéau" has at Brazzaville been made the object of a prolonged examination of which the results will be communicated later.

2. In the light of observations already relatively old and concerning patients the treatment of whom finished at least a year ago, it is possible to be certain that the French product easily bears comparison with tryparsamide.

(a) In the first stage of the disease and after only a single series of injections amounting to about 0.24 gm. per kilo, the authors have met with some cases in which sterilization has been maintained for more than a year, with normal spinal fluid. The drug, which is slightly more toxic, should apparently be injected in an initial dose of 0.02 gm. per kilo and should gradually be increased to a maximum amount of 0.03 gm. per kilo.

(b) In the second period, vomiting and emaciation, which are probably signs of a greater elective action on the nervous system, compel more prudence. In cases with pronounced changes in the spinal fluid the initial dose should not exceed 0.015 gm. per kilo and should not be increased beyond 0.04 gm. per kilo.

It is not yet possible to give the percentage of brilliant results and of failures, in order to compare the drug with tryparsamide. But it is already established that for the one as for the other of these drugs the best prognostic of cure is furnished by the return of the spinal fluid to normal at the end of the first course of injections. The results obtained by smaller amounts than 0.25 gm. per kilo are very transient.

The cures of consolidation appear useless; those of recovery after relapse illusory.*

The failures are observed as a rule seven months after the end of an insufficient treatment.

Previous atoxyl treatment does not appear to interfere with the therapeutic action of "270 Fourneau."

The ocular disturbances are not more frequent than are those due to tryparsamide.

3. When injected in a single very prolonged series "270 Fourneau" appears to give very good results, quite as satisfactory as, if not superior to, those obtained with tryparsamide. The fact that it can be readily given subcutaneously makes it a weapon of predilection.

W. Y.

VAN DEN BRANDEN (F.), CLEVERS & MOREELS. Essai de traitement de la trypanosomiase humaine et des infections animales à *T. congolense* par le "2754" Hoechst. Note préliminaire. [**Treatment of Human Trypanosomiasis and Congolense Infections in Animals by 2754 Hoechst.**—*Bull. Soc. Path. Exot.* 1927. Oct. 12. Vol. 20. No. 8. pp. 734-737. [Lab., Léopoldville.]

The drug examined was obtained from Hoechst; it is a new pentavalent arsenical numbered 2,754, containing 27.2 per cent. of arsenic and allied to tryparsamide. It was supplied in ampoules containing 1, 2 and 3 gm. for the treatment of human cases and in ampoules containing 8, 10 and 12 gm. for use in animals.

In human beings the drug was given intravenously in doses of 2 or 3 gm. diluted in 10 cc. of distilled water. Six patients, 5 of whom were chronic, were treated. One patient weighing 53 kilos. appeared worse after ten injections each of 3 gm., given at an interval of 5 days; his urine contained albumen, but on suitable diet this disappeared and the treatment was continued, 2 gm. per week being given without further trouble. In a second patient signs of renal irritation appeared after a course of seven injections each of 3 gm. given within 33 days.

* Les cures de consolidation paraissent inutiles; celles de repêchage, après rechute, illusoirs.

Peripheral sterilization was, as a rule, obtained 4 or 5 hours after an intravenous injection of 2 or 3 gm. No attempt was made to ascertain the duration of the peripheral sterilization following a single dose. Details are given concerning each of the six patients treated by a first series of injections. From these it appears that "2754 Hoechst" has a trypanocidal action; in two patients at the beginning of the second stage the lymphocytosis of the spinal fluid disappeared after a series of 10 injections of 2 gm. each, given at 5 or 6 day intervals. In a third patient the lymphocytosis was greatly diminished after the administration of 20 gm. given in weekly doses of 2 gm. Observation of the patient is being continued.

The drug was further tested in two mules infected with *T. congolense*. The conclusion reached was that as is the case with all other arsenicals "2754 Hoechst" has no action on this trypanosome.

W. Y.

CHESTERMAN (Clement C.) & TODD (Kenneth W.). **Clinical Studies with Organic Arsenic Derivatives in Human Trypanosomiasis and Yaws.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1927. Nov. 25. Vol. 21. No. 3. pp. 227-232. [2 refs.]

Four cases of sleeping sickness in all of which the cerebro-spinal fluid was greatly changed were treated by oral administration of tryparsamide (base). Doses up to .15 gm. per kilo could be tolerated after initial smaller doses and, apart from slight diarrhoea or vomiting, no sign of poisoning was noted. All showed marked clinical improvement and this was confirmed by spinal puncture. Progress was, however, slow and in two cases it was thought wise to continue treatment by injection of the sodium salt.

Clyclosan, another pentavalent arsenical, somewhat resembling tryparsamide, has proved actively trypanocidal in animals; it is, however, somewhat toxic. It was tried orally on two patients, but its trypanocidal power in human beings was found to be small. Its toxic properties precluded further trial.

W. Y.

FOURCHE (J. A.). Résultats prophylactiques comparés, donnés par deux méthodes différentes de traitement, appliquées en régions très infectées de trypanosomiase. [**Comparison of Prophylactic Results in Two Regions Severely Trypanosome-Infected and treated by Different Methods.**]—*Bull. Soc. Path. Exot.* 1927. Nov. 9. Vol. 20. No. 9. pp. 883-895.

In itinerant prophylaxis it is difficult to appreciate, even approximately, the extent to which treatment of the infected and their sterilization has protected the healthy population. The index of sterilization obtained amongst the old cases assures us that we have obtained a therapeutic result and from this it is deduced that a prophylactic result is also obtained, but this deduction has little quantitative value. It is asserted that if the index of new infections is slight the result has been good, whereas if it is high the result is bad. The natural evolution of the disease could be ascertained if it were possible to leave a sector, which has been thoroughly examined, without treating the sick; and this might serve as a standard of comparisons for similar sectors where the sick were treated.

The author continues to discuss in some detail the difficulties surrounding this problem, and then passes to a consideration of his own observations. During the present year he has fortunately had occasion to re-examine in the same manner, and after the same interval, two series of centres which were equally infected at the first examination and which had been subjected to two different methods of treatment. In one of them not only the definitely infected were treated, but also the suspects; and in the other only the certainly infected. The results of the re-examinations are set forth in the present paper.

The centres where both sick and suspects were treated were those of Kateba, Tshimbalanga and Mwamba Gufulu; in them 9.7 per cent. of the population was found to be infected at the first examination in 1926. The centres where only the sick were treated were those of Kamwenansafo, where 9.6 per cent. were found infected at the first examination. In the first group the treatment of the sick and suspects (i.e., showing typical glands, but puncture negative) was 6 to 10 injections of 1 gm. of atoxyl, and in the second group, where the sick only were treated, 12 injections of a similar amount of atoxyl were given. The first group were re-examined after an interval of 10 months, and the second after 12 months.

The results of the re-examination of the two groups are given in detail and are compared. The therapeutic result in the infected cases was excellent and equal in both districts. More than 85 per cent. of these cases were negative and in good health on re-examination. Turning to the result of examination of the new population, by which is meant the individuals who for one reason or another escaped observation at the first examination of the districts, it was found that of 675 such persons in the first district, where both definitely infected and doubtful cases were treated, 53 (8.0 per cent.) were infected, and of 1867 in the second district, where only the definitely infected were treated, 397 (8.76 per cent.) were infected.

The author now passes to a consideration of the number of new cases amongst the populations previously examined. In the first district the number previously examined was 1,889 and among these 18 definitely infected new cases were discovered and one doubtful case (1.0 per cent.); in the second district the number previously examined was 6,532 and among these 345 definite new cases were found and 57 doubtful cases (6.18 per cent.). In a footnote attention is drawn to the fact that in the second district a large number of the new cases were found to be those who were doubtful at the first examination.

The author believes that the differences in prophylactic results are only to be explained by the difference in the method of treatment.

W. Y.

BROWNING (C. H.) & GULBRANSEN (R.). **The Treatment of Relapses in Experimental Trypanosome Infections: Cures after Repeated Relapses without increasing the Dose of the Chemotherapeutic Agent.**—*Jl. Path. & Bact.* 1928. Jan. Vol. 31. No. 1. pp. 134-136.

It has been generally accepted that trypanosome infections are most readily sterilized by the initial treatment with a chemotherapeutic agent. Relapses respond less well to treatment; and if the same therapeutic substance is administered repeatedly in non-sterilizing

doses to an infected animal a drug resistant strain of the parasite tends ultimately to develop. The authors have found, however, that in mice infected with *T. brucei* cure may be brought about, in a proportion of cases, after a number of relapses have occurred, each of which was treated with the same dose of the same substance. The relapses were treated with 2-p-acetylaminostyryl-6· dimethylaminoquinoline methochloride. For the initial treatment either an allied compound was employed or a non-sterilizing dose of the same substance as was used in the relapses. The doses employed were always remote from the toxic limit. The trypanosomes used were three different strains of *T. brucei*, all of which caused death within 72 hours of inoculation. The interval between the relapses was quite irregular in many of the cases. Illustrations are given. It is evident from the irregularity of the intervals between the relapses that mere accumulation of the drug in the body did not account for the ultimate sterilization. This is further supported by the fact that a large number of relapses may fail to be cured by the same procedure, e.g., in an animal twelve relapses over a period of about 18 weeks. Also in prophylactic tests with control animals which received the largest dose of the drug employed and were then inoculated two days later practically no retardation of the progress of the infection occurred. It is further noted that a strain can be made resistant to the drug by the usual methods.

The authors point out that the factors involved in the explanation of this phenomenon are extremely complicated. They include on the part of the host the capacity of the tissues to co-operate with the therapeutic agent by immunity mechanisms, etc., and on the part of the parasite accommodation to the anti-bodies produced (serum-fastness), as well as alterations in susceptibility directly or indirectly to the drug, i.e., drug-fastness, or hypersensitiveness as tested in another animal. The present work has demonstrated that the changes in the various factors occurring in the course of relapses after treatment by chemotherapeutic agents need not always be adverse to the individual host, but may conduce to ultimate sterilization of the infection. This does not affect the principle that vigorous initial treatment affords the best prospect of cure. But in the light of the observations recorded above, it must not be assumed that, because a given therapeutic agent, in a given dose, has failed to effect sterilization initially or in a relapse, the same dose of the same drug must therefore necessarily fail to lead to cure in subsequent relapses.

W. Y.

REINER (L.) & KÖVESKUTY, Jr. (J.). Ueber den Wirkungsmechanismus von Bayer 205. [**The Mode of Action of Bayer 205.**—*Deut. Med. Woch.* 1927. Nov. 18. Vol. 53. No. 47. pp. 1988–1989. With 2 text figs. [11 refs.] [Hyg. Inst., Hungarian Univ., Budapest.]

The problem of the mechanism of action of chemotherapeutic substances is still rather involved. The oldest view that the drugs act directly upon the micro-organisms was promulgated by EHRLICH and his school and received support from the investigations on the genesis of arsenic resistance. Brief reference is then made to the work of various other authors, some of whom support the hypothesis of direct action of drugs and others that of indirect action.

In considering the matter it is of importance to ascertain whether the first point of attachment of the drug is the infected animal or the parasite. This is, for various reasons, very difficult to investigate experimentally and in order to obtain information the authors decided to attack the problem indirectly.

From the blood of infected rats a trypanosome suspension was prepared and divided into two equal portions. To the first portion was added a mixture of bouillon and normal saline containing 0.5 per cent. "Bayer 205" and to the second a mixture of the bouillon and saline only. After 30 minutes both were centrifuged and the trypanosomes washed thrice with fresh bouillon saline solution.

Four rats of approximately the same weight were selected and treated as follows.—Rat A was given 1 cc. of suspension I, Rat B 1 cc. of suspension II, Rat C 1 cc. of suspension I+0.1 cc. of suspension II, and Rat D 1 cc. of suspension II+1 cc. of the third washings of suspension I. Rats A, B and D all had the same number of trypanosomes, but different amounts of Bayer, whilst Rats A and C had the same amount of Bayer, but slightly different numbers of trypanosomes. The animals showed trypanosomes in their blood in the following order, Rats B, C, D, and A, and died in the same order. But whereas Rats B, C, D all died about the same time, Rat A lived much longer and if the dose of trypanosomes did not exceed a hundred thousand, it frequently lived indefinitely. From these experiments it is concluded that the survival of Rat A is due to the "Bayer 205." They furthermore enable one to decide whether the drug acts through the co-operation of the animal body, or directly on the parasite. If the co-operation of the animal organism were necessary, it would be immaterial whether the drug was bound to the parasite or not; and Rats A and C, in which the amount of "Bayer 205," was the same, and the number of trypanosomes varied only by 10 per cent., would have died about the same time. It follows that the drug bound to the parasites had no action on the untreated trypanosomes injected at the same time. The drug exerts its action directly on the parasites, a *sine qua non* for which is the binding of the drug by the parasites.

Since "Bayer 205" alone does not kill the trypanosomes, the animal body must take some part in the curative process. Possibly this fact corresponds to the normal defence against infective diseases, which, however, can only be effective against Bayer-laden trypanosomes. If this be the case the action of drugs is similar to that of opsonins. It is possible, however, that the drug which is bound to the parasites is changed—possibly through oxidisation—into a parasitocidal substance.

W. Y.

MOSCHKOWSKI (Sch.). Zur Frage des Wirkungsmechanismus von Germanin (Bayer 205) auf Trypanosomen. [**The Mechanism of the Action of Germanin on Trypanosomes.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1927. Nov. Vol. 31. No. 11. pp. 541-552. [13 refs.] [*Trop. Inst., Moscow.*]

In the experiments described in this paper, the author used guinea-pigs, and to a less extent mice, infected with *T. brucei* or a trypanosome known as *su-auru* (*T. evansi*?) obtained from a camel naturally infected in the Russian Steppes. The first series of experiments had for their object the investigation whether the destruction of the trypanosomes

in guineapigs treated by "Bayer 205" was due to a disturbance of their divisional processes as has been shown by MAYER and ZEISS to be the case in mice and by SEI and also by SHINTAKE in mice and rats.

The dose employed was usually .05 gm. *per os* for a 600-800 gm. guineapig; this caused the trypanosomes to disappear slowly from the blood and was generally followed later by a relapse. Dry blood films were subsequently made each day and 500 trypanosomes counted and classified into ten categories according to whether they were (1) normal, (2) had two blepharoplasts, (3) two nuclei, (4) two nuclei and two blepharoplasts, (5) dividing, (6) almost completely divided, (7) separating into three, (8) with three nuclei or three blepharoplasts, (9) blepharoplastless and (10) quite bizarre forms. The results of nine such experiments are set forth in tables. From these it is seen that there was no definite increase in the percentage of divisional forms.

A small series of experiments were next undertaken in order to examine the findings of MAYER and ZEISS, LANGE and KERSTEN and others that the trypanosomes present in the blood the day after treatment had lost their virulence. The results are set forth in tables from which it is seen that the subinoculated animals became infected in each instance.

A number of experiments were also performed with a view to ascertaining the action of "Bayer 205" on the camel trypanosome *in vitro*. Concentrations of 1:1,000 of the drug acting on the trypanosomes for half an hour at 37° C. did not prevent infection when the mixture was subsequently injected into mice and guineapigs, but the incubation period was prolonged; when the period of incubation of the mixture at 37° C. was lengthened to 1½ or 3 hours, infection did not take place when the mixture was subsequently injected into mice.

In order to compare the results of these experiments on the concentration which *in vitro* leads to a decrease of virulence of the trypanosomes, the author determined the concentration necessary to produce a cure on subcutaneous injection. The active concentration was found to be in the region of 1:3,000 of the body weight of the animal, which does not deviate much from the active dose *in vitro*. Insufficient dosing may convert an acutely fatal infection into a chronic infection in which the animals eventually die with cachexia, paralysis, and often without parasites in their blood.

W. Y.

GIEMSA (G.) & MAYEDA (S.). Ueber trypanozide Wirkung eines neuen organischen Arsenpräparates "B.R.68" bei Nagana-mäusen. [The Trypanocidal Action of a New Organic Arsenic Preparation "B.R.68" in Nagana Mice.]—*Abhandl. a.d. Gebiet d. Auslandskunde. Hamburg Univ.* 1927. Vol. 26. (D., Med. & Vet. Vol. 2.) [Festschrift NOCHT.] pp. 139-145. [Inst. for Ship & Trop. Diseases, Hamburg.]

In the compounds of arsinic and arsenic acids hitherto employed therapeutically (atoxyl, tryparsamide, spirocide, salvarsan, arsalyt, Albert 102, etc.) the arsenic is always bound on to the benzol nucleus. BINZ and RÄTH have, however, lately succeeded in introducing arsenic into heterocyclic ring systems with cyclically bound nitrogen (pyridin, chinolin), and have produced a number of new well-characterized compounds of pyridin and chinolin groups.

It is with one of these, "B.R.68," the formula of which is not disclosed—for the same reason that those of "Bayer 205" and plasmochin were withheld—that the authors have conducted their therapeutic experiments in mice infected with *T. brucei*. The product is a yellowish brown powder readily soluble in water and forming a neutral solution which can be immediately injected. It was supplied in ampoules. The toxicity on subcutaneous injection is compared with that of tryparsamide and atoxyl. The maximum tolerated dose per gm. of mouse is given as follows—"B.R.68" .2 mgm., tryparsamide .62 mgm., atoxyl .2 mgm., and the lethal dose as .25 mgm., .7 mgm. and .25 mgm. respectively. The therapeutic action of the three substances was tested in mice infected with the nagana strain "Prowazek" and also with an arsenic resistant strain "30." The experimental results are set forth in tables. It was found that under these conditions "B.R.68" was distinctly more efficacious than either of the other two drugs. The chemotherapeutic index, i.e., the curative dose as compared with the maximum well tolerated dose, was, in the case of "B.R.68" 1 : 25, in tryparsamide 1 : 2, in atoxyl 1 : 1, for the strain "Prowazek," and 1 : 5-6-6, and 0-1 : 1, respectively for the arsenic resistant strain "30." Reference is made to the fact that the experiments of RÄTH with nagana infected rabbits are, so far as they go, in agreement with the above observations. The authors point out that it cannot be assumed the drug will prove useful in man, and they refer to arsenophenylglycin which in mice is most active, and yet on account of certain undesirable effects cannot be used clinically.

W. Y.

DUNNING (Fitzgerald) & MACHT (D. I.). **Azo Dyes containing Antimony in the Treatment of Trypanosomiasis.**—*Jl. Pharm. & Experim. Therap.* 1928. Jan. Vol. 32. No. 3. pp. 205-213. [11 refs.]

In previous papers, the preparation of a series of azo dyes containing antimony, derivatives of stibanilic acid, was described. Since then several other similar preparations have been made. The trypanocidal power of all these compounds has been tested. Rats infected with *T. equiperdum* were used. This paper, which is of a chemical nature, should be consulted in the original by those who are interested.

Whilst many of the compounds exhibited no trypanocidal properties, certain derivatives were found to be to some extent trypanocidal. The results hitherto obtained indicated that several compounds worthy of more thorough examination had been obtained, but they did not permit of any positive assertions concerning the practical use of these compounds in the treatment of trypanosomiasis.

W. Y.

SCHNITZER (R.) & SILBERSTEIN (W.). Untersuchungen zur Chemozeptorentheorie. VI. Mitteilung. Der "Sulphydryl-Chemozeptor." Seine Beziehungen zum Interferenzphanomen. [Investigations into the Chemoreceptor Theory. The "Sulphydryl-Chemo-receptor" and the Interference Phenomenon.]—*Ztschr. f. Immunitätsf. u. Experim. Therap.* 1927. Dec. 5. Vol. 53. No. 5/6. pp. 439-461. [4 refs.] ["Robert Koch" Inst., Berlin.]

Reference is made to previous papers on this subject by the authors and by BROWNING and GULBRANSEN [this *Bulletin*, Vol. 19, p. 882 and Vol. 24, p. 571 and p. 965].

The following summary of the present communication is given :—

Experiments on the inhibition of the trypanocidal action of tartar emetic and oxy-aminophenylarseno-oxide by sodium thioglycolate have given the following results :

1. Mixing of the agents *in vitro* and testing of the mixture as regards toxicity for mice and trypanocidal action in nagana infection of mice.

(a) Tartar emetic : very quickly arising extensive poisoning, but no arresting of the trypanocidal power. This is first appreciable after the agents have acted on one another for 24 hours.

(b) Arseno-oxide : poisoning after 1–3 hours contact. Complete arrest of the trypanocidal action apparent after contact for 1 hour.

(c) *In vitro*. No inhibition of the trypanocidal action is seen in the case of tartar emetic and arseno-oxide, when the arrest of the infectivity for mice is chosen as the test.

2. Separate administration of sodium thioglycolate and tartar emetic or arseno-oxide, with or without an interval :

(a) Tartar emetic : no toxic effect, but considerable limiting of the trypanocidal action.

(b) Arseno-oxide : no toxic effect, but great inhibition of the trypanocidal action.

Comparison of the various observations on the influence of the toxicity and trypanocidal action of tartar emetic and arseno-oxide, both in regard to the views developed by Voegtlin and his collaborators on the one hand, and to those of the authors on the other, show that the sulphydryl groups of the protoplasm cannot be regarded as the chemically defined chemoreceptors of the arsenicals. Toxicity on the macro-organism and specific chemo-therapeutic action on the trypanosomes must be considered to be different processes. The inhibition of the trypanocidal action through sulphydryl-containing compounds is allied to the "interference phenomenon" and is associated with a binding of the—not trypanocidal—inhibiting agent on the trypanosome cell. A modification of the respective chemoreceptor systems is bound up with this, which finds its expression in a loss of action of the trypanocidal agent.

W. Y.

SILBERSTEIN (W.). Untersuchungen zur Chemozeptorentheorie. VII. Mitteilung. Biologisches Verhalten der Trypanosomen im Interferenzversuch. [Investigations into the Chemoreceptor Theory. VII. Biological Behaviour of Trypanosomes in the Interference Experiment.]—*Ztschr. f. Immunitätsf. u. Experim. Therap.* 1928. Jan. 16. Vol. 54. No. 3/4. pp. 324–334. [11 refs.] ["Robert Koch" Inst., Berlin.]

The following summary is given :—

1. With the combined administration of sodium thioglycolate and tartar emetic in trypanosome-infected mice, and also with other known conditions of interference experiments, there appear in instances of incomplete interference, i.e., where the trypanocidal action is not entirely inhibited, three types of infection which deviate from the normal :—

- i. Early relapse.
- ii. Intermittent infection,
- iii. Continuous infection.

2. In the early relapse and intermittent infections, the relapse strain is always different from the original strain, and in the continuous infections it is very frequently so.

3. The biological modification of the strain is due to the combined action of chemical and immune powers whereby a special significance

devolves upon the relapse bodies (Rosenthal). The close relationship between chemo- and immune-receptors is considered to be in accord with the conception of complex chemoreceptors (primary binding nuclei).

W. Y.

REICHENOW (E.) & REGENDANZ (P.). Ueber die Flohpassage normaler und mit Arsenophenylglycin vorbehandelter Rattentrypanosomen. [**The Flea Passage of Normal Rat Trypanosomes and of those previously treated with Arsenophenylglycin.**—*Abhandl. a.d. Gebiet d. Auslandskunde. Hamburg. Univ.* 1927. Vol. 26. (D., Med. & Vet. Vol. 2.) [*Festschrift NOCHT.*] pp. 446-460. [15 refs.] [*Inst. for Ship & Trop. Diseases, Hamburg.*]

In these experiments the authors have investigated the behaviour of a strain of *T. lewisi*, previously treated with arsenophenylglycin, after natural transmission by means of fleas. The first part of the paper is concerned with certain observations on flea passage of the parasite. As the result of a number of preliminary experiments, it was found that 18° C. is the lowest temperature at which *T. lewisi* will develop in the flea's intestine. Support was also obtained for the contention of MINCHIN and THOMSON that only a small proportion of the trypanosomes taken up by the flea can undergo development in the intestine. The occurrence of flea infection is thus dependent on a heavy rat infection and on atmospheric temperature. It was further found that the rapidity with which development occurred in the flea's intestine depended on temperature and that the intensity of the infection varied with that of the blood of the rat upon which the flea was fed.

Details are given in a table of 26 experiments in which an attempt was made to infect rats by feeding them with the infected faeces of fleas. In 15 of these the rats became infected. It was determined that the infectivity of the flea's faeces for rats depended directly on the number of parasites contained. It was noticed, however, that not all of the rats which had received even the greatest number of parasites became infected. Since all the rats did not lick fresh faeces from their body, it is possible that in a proportion of cases the bites of the fleas might play a part. The incubation period in natural infections is rather longer than in infections produced by inoculation of blood. The natural infection differs strikingly from that produced by inoculation of blood: in the former the period of multiplication of the trypanosomes lasts much longer, so that the number of parasites found in the blood is much greater. In inoculated infections division forms are found on only one or at most two days, whilst in natural infections they are usually found for at least four or five days. A similar state of affairs is found in blood inoculations into rats which have been splenectomized.

Passing to the second portion of their work, viz., the influence of flea passage on the susceptibility of *T. lewisi* to arsenophenylglycin, the authors first of all decided to determine the action of the drug on a normal strain of *T. lewisi*. It was found that the curative dose at the time when the trypanosomes possessed the greatest power of resistance, i.e., when the multiplication period was over and the number of parasites in the blood was very great, was .17 gm. per kilo of body weight, whilst in cases where the number of trypanosomes was

less or during division smaller doses sufficed. But even small doses brought the multiplication processes to an end within 24 hours.

The authors describe their attempts to produce a strain of *T. lewisi* resistant to arsenophenylglycin. Their success was, however, only slight and the most they succeeded in doing was to obtain a strain which in certain mice resisted as much as .2 gm. per kilo of the drug. They then proceeded to enquire whether this slight increase in resistance to arsenophenylglycin was lost after passage of the trypanosome through the flea, or whether its susceptibility to the drug was in any way changed. A number of experiments were made and the results are set forth in tables. The first experiment was performed with a normal strain of *T. lewisi* obtained from a previously untreated Rat 14. Four fleas were infected from this rat and three other rats, Nos. 2, 4 and 6, then infected from the fleas' faeces. It was found that two injections of .13 gm. per kilo of the drug sufficed to clear the parasite from the blood of Rat 14, but that Rat 2 resisted two similar injections, and Rats 15 and 16 resisted one injection of .15 gm. per kilo, but were cured by a second injection of .2 gm. per kilo. The authors state that these results are very similar to those obtained in experiments where the transference of the parasite was by blood inoculation; and they conclude that the flea passage exerts no influence one way or the other on arsenic resistance. As the results of the two experiments performed with slightly resistant arsenophenylglycin-resistant strains, the authors conclude that passage through the flea had no definite effect on the strain. [The reviewer is of opinion that in these experiments, as in the case of DUKE's, the increase in arsenic resistance of the strain employed was so slight that it is hardly safe to form any definite conclusion from them.]

W. Y.

LEVADITI (C.) & DELORME (M.). Mécanisme pathogénique des accidents nerveux tardifs des trypanosomiasés. [**Pathogeny of Late Nervous Symptoms in Trypanosomiasis.**—*C.R. Soc. Biol.* 1928. Jan. 4. Vol. 97. No. 36. pp. 1693-1695.]

Rabbits were injected, by sub-occipital puncture, with the blood of mice containing numerous *T. brucei*; the injections were repeated at various intervals. The authors determined, among other facts, the fate of the injected parasites both by direct observation and by injection into mice, their appearance in the circulation, the trypanocidal power of the blood and of the cerebro-spinal fluid, and the resistance to antibody of the flagellates isolated from the spinal fluid.

The trypanosomes introduced into the subarachnoid cavity of fresh rabbits persist in the spinal fluid about 5 days and then disappear suddenly. A veritable crisis occurs comparable to that seen in the blood. The parasites invade the general circulation from the commencement.

The parasites of the first re-inoculation given some days after the crisis disappear the day after the injection and their disappearance is accompanied by a marked local leucocytosis. This fact proves that the nervous system, and its annexes, participate rapidly in the state of immunity acquired by the whole organism. The phenomenon of "neuro-immunity" appears each time that the flagellates are re-inoculated into the cerebrospinal fluid and during all the period which precedes the stage of cachexia. When this period is established and

one observes at times nervous phenomena, such as rigidity and contractures, the refractory state of the nervous system and its annexes seems to give way. Trypanosomes inoculated subdurally now persist for a long time in the subarachnoid space. In animals which succumb or are killed at this stage trypanosomes can be demonstrated in the nervous system by sub-inoculation into mice, although the circulation may be free from them.

Neuro-immunity is due to trypanolytic antibody which causes *in vitro* definite lysis of the organisms and their attachment to leucocytes. The antibody appears simultaneously in the cerebro-spinal fluid and in the blood, so that it is impossible to state where it is elaborated. The trypanosomes isolated from the cerebrospinal fluid during the period of neuro-immunity are found to be partially antibody resistant. The injection of the flagellates into the blood may be followed by their appearance in the spinal fluid as shown by subinoculation of mice. The animals injected in this manner behave as do those inoculated subdurally, with the difference that the immunity of the nervous system in the latter is more marked than in the former.

W. Y.

KLIGLER (I. J.). **Relation of Temperature to Susceptibility of Host to Disease.**—*Proc. Soc. Experim. Biol. & Med.* 1927. Oct. Vol. 25. No. 1. pp. 20–21. [1 ref.] [Dept. of Hygiene, Hebrew Univ. Jerusalem.]

Reference is made to a previous paper [this *Bulletin*, Vol. 24, p. 575] in which it was shown that insolation or immersion in water for short periods lowers the resistance of guineapigs to a trypanosome infection. As insolation produced a rise in body temperature of 1.5° C. and immersion a fall of 2.5° C., it was possible that the effect might be referable to temperature changes. The experiments described in this paper were therefore undertaken to ascertain the effect of low and high environmental temperatures on the relative susceptibility of animals to infection. White rats of the same age and weight were injected intravenously with the same dose of trypanosomes (*T. evansi*) and divided into two groups. One set was placed in a dark room at 28°–30° C. and relative humidity of 45, and the other in a similar room at 10°–12° C. and relative humidity of 70 to 80. The results of the experiments indicate that temperature has no effect on the course of the trypanosome infection in rats; the effect in guineapigs is now being investigated.

W. Y.

KLIGLER (I. J.) & RABINOWITCH (G.). **Susceptibility and Resistance to Trypanosome Infections. III. The Relation of Dosage to the Course of Infection.**—*Ann. Trop. Med. & Parasit.* 1927. Oct. 10. Vol. 21. No. 3. pp. 375–380. [4 refs.] [Dept. of Hyg., Hebrew Univ., Jerusalem.]

The purpose of the experiments described in this paper was to ascertain the effect of dosage on the course and duration of a trypanosome (*T. evansi*) infection. The rat proved to be a more satisfactory gauge than the guineapig, because the disease is of short duration and progresses steadily as an acute infection with fatal termination. In both animals the acuteness and speed of the onset

of the infection may be controlled by the size of the infecting dose. In the guineapig a dose of 50 or 100 million trypanosomes shortens the incubation period to one day, while the injection of 100 trypanosomes results in an incubation period of fourteen days. In the rat animals of the same age and weight receiving 1,000 organisms will live on an average one and a half to two weeks longer than those receiving a million. The smaller the dose the greater is the possibility of the factors of native individual resistance coming into play. Not only is the dosage *per se* important, but the dose in relation to age or, in these animals, body weight, is most significant. Animals of different weight receiving the same number of organisms react entirely differently, the smaller animal succumbing, as might be expected, much sooner than the larger ones. Differences only become appreciable when the doses vary by multiples of 100 or 1,000.

W. Y.

MUTERMILCH (S.) & SALAMON (E.). Contribution à l'étude du mécanisme de la création des races des trypanosomes du nagana anti-corps-résistantes. [**Mechanism of the Creation of Races of Nagana Trypanosomes Resistant to Antibodies.**—*C.R. Soc. Biol.* 1928. Feb. 10. Vol. 98. No. 5. pp. 345-347. [4 refs.] [Pasteur Inst., Paris.]

Reference is made to the fact that in experimental nagana infection of the guineapig inoculation into the peritoneum is followed by the appearance of parasites in the blood, where they multiply for four or six days; they then disappear suddenly from the general circulation, only to reappear some days later. The disappearance of the trypanosomes coincides with the appearance of lytic properties of the serum, and the trypanosomes which relapse are resistant to the action of such serum.

Two hypotheses have been advanced to explain the curious phenomenon of the strains of trypanosomes antibody resistant. (1) That of MOORE and BREINL (1907), who describe latent bodies from which, by a process of sexual evolution, new flagellates are formed; and (2) that of LEVADITI and Mutermilch (1909), who believe that it is the result of a simple selection of a few trypanosomes gifted with a natural immunity to the antibody, and that these individuals, after having resisted the lytic action of the serum, give rise to the new strain of resistant trypanosomes. As the result of filtration experiments on (a) mixtures of trypanolytic sera and trypanosomes, and (b) organ extracts obtained during the crisis, the authors have reached the conclusion that the relapses in the guineapig are not due to ultramicroscopic resistant bodies, but to a simple selection as was conceived by LEVADITI and Mutermilch.

W. Y.

MUTERMILCH (S.) & SALAMON (E.). Contribution à l'étude du mécanisme de la crise chez le cobaye trypanosomié. [**Mechanism of the Crisis in the Trypanosome-infected Guineapig.**—*C.R. Soc. Biol.* 1928. Feb. 10. Vol. 98. No. 5. pp. 348-350. [2 refs.] [Pasteur Inst., Paris.]

According to MASSAGLIA and others, trypanosomes during the crisis in the guineapig take refuge in several of the organs and are

found in the greatest number in the haematopoietic organs. In order to verify this statement, the authors sacrificed a considerable number of guineapigs during the crisis, from the moment of disappearance of the flagellates from the general circulation up to the moment of relapse. The animals were killed by puncturing the heart and withdrawing from it 25 cc. of blood. A small portion of 2-3 cc. was immediately defibrinated and the rest was allowed to clot. Pieces of the organs—liver, spleen, and bone-marrow—were then ground up with ten times their volume of simple bouillon. From these original emulsions, dilutions up to 1 in 1,000 were prepared, as were also dilutions of the defibrinated blood. Equal portions of all of these dilutions were injected into mice, in order to follow the development of the infection in these animals. It was found (1) that the organ extracts were, in the great majority of cases, virulent, (2) that the blood was always distinctly more virulent than the organ extracts, and that the virulence of the extracts would probably be explained by the small amount of blood they contained. From work of this sort it is concluded that the organs did not serve as a place of refuge for the trypanosomes during the crisis, and that the trypanosomes did not entirely disappear from the general circulation at the commencement of the crisis.

The question whether the trypanosomes become antibody resistant at the commencement of the crisis or whether their selection is a continuous process is next considered.

Experiments suggest that the latter is probably the correct explanation. It was further found that the trypanolytic antibody increased progressively from the first to the fourth stage of the crisis and then remained stationary until the relapse. The mechanism of the crisis in guineapigs infected with trypanosomes is believed to be as follows: After a septicaemia lasting four to six days, specific antibodies, secreted by the haematopoietic organs, appear suddenly in the general circulation; the amount is at first minimal and suffices to destroy all the most sensitive parasites. The fresh quantities of lytic antibody which continue to be poured into the circulation destroy progressively the less resistant parasites, and finally only those which have a natural resistance survive. These multiply and give rise to the relapses. The internal organs do not serve as a place of refuge for the trypanosomes nor do there appear to exist in the course of the crisis filtrable forms of the trypanosomes.

W. Y.

CORDIER (G.). Etude de quelques propriétés physiques du sérum d'animaux atteints de trypanosomiase. [**Study of Physical Properties of the Serum of Animals infected with Trypanosomes.**] —*C.R. Soc. Biol.* 1928. Feb. 3. Vol. 98. No. 4. pp. 315-316. [Arloing Inst., Tunis.]

The author has studied some of the physical properties of the serum during the course of trypanosomiasis in various animals. The animals used were horses, donkeys, mules and sheep, and they were infected with *T. equiperdum* or a trypanosome from Morocco. The examinations made were (1) The viscosity determined by the viscosimeter of Hess, (2) The superficial tension determined by means of Tate's

formula, (3) The pH by the colorimetric method, and (4) The formol-gel reaction. The results are given in tables. It was found that the viscosity, and the pH, in dourine increased as the disease developed; the superficial tension increased during the periods of oedema.

In the animals infected with the Moroccan strain the results were irregular.

W. Y.

NATTAN-LARRIER (L.) & LÉPINE (P.). Etude comparative de l'action sur les trypanosomes du sérum de la mère et de celui de l'enfant nouveau-né. [**Comparative Study of the Action on Trypanosomes of Sera of Mother and New-Born Baby.**—*C.R. Soc. Biol.* 1927. Dec. 2. Vol. 97. No. 33. pp. 1470-1472.]

The maternal blood was obtained from a vein of the arm at the time of delivery, and that of the new-born child from the cord. The blood was then allowed to clot on ice for 36 hours. In each experiment nine mice were used; each was given a definite amount of nagana infected blood, one animal then served as a control, 4 were treated 24 hours later with the maternal serum, and 4 with the foetal serum: the amount of serum given to each of the 4 mice was respectively 1 cc., 0.5 cc., 0.25 cc. and 0.1 cc.

In all, the sera of 12 women and 12 new-born children were tested in this way. The broad results were that the maternal serum exhibited definite therapeutic action, sometimes even when employed in the smallest doses of .1 cc., whereas the foetal serum was much more rarely active and its curative power much more feeble. Furthermore, there was no parallelism between the activity of the various foetal sera and that of the maternal sera.

From this work it is concluded that the substances of human serum, which act on *T. brucei*, are not capable of passing from the maternal blood to that of the foetus.

W. Y.

NATTAN-LARRIER (L.), LÉPINE (P.) & MAY (J.). Recherche de l'alexine et des anticorps naturels dans le lait de la femme. [**Search for Alexin and Natural Antibodies in Woman's Milk.**—*C.R. Soc. Biol.* 1927. Dec. 2. Vol. 97. No. 33. pp. 1472-1474. [1 ref.]

The authors have examined the milk of 25 women obtained under the best conditions within the first few weeks following delivery. The specimens were allowed to stand on ice for 20 hours and then centrifuged, the fluid thus obtained being used in the experiments.

No evidence of alexin was detected in any of the specimens nor was any trace of haemolysin discovered. Finally, the samples were examined for the presence of anti-trypanosomal substance which is present in normal human serum: here again the result was negative.

W. Y.

NATTAN-LARRIER (L.). L'hérédité de la maladie de Chagas. [**Heritability of Chagas' Disease.**—*Bull. Acad. Méd.* 1928. Jan. 17. Year 92. 3rd Ser. Vol. 99. No. 3. pp. 97-99.]

CHAGAS drew attention to the fact that American trypanosomiasis was very common in children under one year of age, and that the parents of these children suffered from goitre or from the cardiac

form of the disease. Possibly this was due to the fact that they lived in houses infested by *Conorhinus*, but it also raised the question whether the disease might not be hereditary. Then came VIANNA's discovery of the parasite in the ova, in the seminiferous tubules, in the spermatid fluid, and even in the spermatozoa. It is, however, simpler to suppose that the parasite traversed the placenta from the blood of the mother to the foetus. NÄGLER in 1913 unsuccessfully sought the parasite in the blood of the young of two infected mice. The author, however, has succeeded in demonstrating experimentally in the guinea-pig that the virus is transmitted by heredito-contagion. He found the trypanosomes in the blood of the young of two of eleven infected females, and in two other cases the amniotic fluid was found to contain *T. cruzi*. CHAGAS a little later demonstrated hereditary transmission of the parasite in a new-born child. How the parasites traverse the placenta is unknown. In order to investigate the problem, the author has studied the histology of the placentas of his infected guinea-pigs. He never found any evidence that the trypanosomes in the flagellate stage succeeded in passing the plasmodial layer directly to the foetal vessels. But on numerous points the plasmodial bands which limit the maternal vessels contained the rounded multiplication forms of the parasite. The multiplication and invasion of neighbouring areas resulted in masses 600 μ to 700 μ in diameter. These masses were rounded, but badly delimited and never encysted; they consisted of innumerable trypanosomes in the rounded or ovoid form. No trace of placental tissue persisted in these masses, but into them and more particularly into their periphery ran foetal vessels which remained permeable, although their endothelial walls abutted directly on the trypanosomes which surrounded them on all sides. The maternal vessels were no longer recognizable in the centre of the nodule, but they remained quite distinct at its boundary, where their lumen stuffed with parasites is delimited by plasmodial bands still intact. It is in these masses and especially at their periphery that the parasites penetrate into the foetal circulation.

W. Y.

DE FARIA (Gomes) & CRUZ, fils (Oswaldo). Sur l'existence d'un stade évolutif intracellulaire du *Trypanosoma cruzi* dans la *Triatoma megista* Burm. [**An Intracellular Stage of *T. cruzi* in *Triatoma megista*.**—*C.R. Soc. Biol.* 1927. Nov. 18. Vol. 97. No. 31. pp. 1355-1357. With 3 text figs. [Oswaldo Cruz Inst., Rio de Janeiro.]

Acting on the suggestion of CHAGAS, the authors examined a dozen specimens of *Triatoma megista* experimentally infected with *T. cruzi*. In addition to the forms which have already been described by CHAGAS, BRUMPT, and others, the authors discovered intracellular forms localized in the posterior part of the intestine. These were, for the most part, leishmaniaform, but, more rarely, trypanosome forms were also discovered; these were long and delicate, with an elongate band-shaped nucleus and with a blepharoplast immediately behind the nucleus or near the posterior end of the parasite. Sometimes masses of parasites were discovered similar to those observed in the case of *T. lewisi*, but the spheres described by MINCHIN and THOMSON in the latter infection were not encountered.

W. Y.

CAMPOS (Ernesto de Souza). Paralysis experimental determinada pelo *Trypanosoma cruzi* de origem humana. [**Experimental Paralysis caused by *T. cruzi* from Man.**].—*Bol. Biol. S. Paulo*. 1927. Sept. 15. No. 9. pp. 153-173. [170 refs.] English summary p. 156. With 4 figs. [Microb. Lab., Faculty of Med., São Paulo, Brazil.]

The author has studied several cases of experimental paralysis in dogs and mice infected with the strain of *Trypanosoma cruzi* obtained from an armadillo. The lesions and symptoms were similar to those previously described with strains of this parasite obtained from other sources. It is stated that after cultivation for a year the parasite lost its virulence and electivity for the nervous tissue. Similar lesions were found in dogs infected with a strain of *T. cruzi* obtained from an acute human case.

W. Y.

NIÑO (Flavio L.). Schizotrypanosis experimental en el gato. [**Experimental Infection of the Cat with *Trypanosoma cruzi*.**].—*Bol. Inst. Clin. Quirúrg.* Buenos Aires. 1927. Vol. 3. Nos. 21-25. pp. 372-382. With 7 text figs. & 2 coloured figs. on 1 plate. [14 refs.] [Also issued as *3a Reunión Soc. Argentina Patol. Regional del Norte, Tucumán, Julio, 7, 8 y 10, 1927.* pp. 264-274 & illustrations.]

Natural infection of the cat by this parasite has been recognized, but the present account is of a cat inoculated with the intestinal contents of infected *Triatoma infestans*. The progress of the resulting disease was very slow; the parasites were not seen in the peripheral blood for 10 weeks after inoculation, and the whole course was 15 months. The chief symptom is a slowly developing paraplegia, without involvement of the sphincters; there is marked mydriasis explained by the fact that the main site of damage in the spinal cord is the cervical enlargement. Aggregations of the leishmanial forms are commonest in the psoas and the diaphragm. A leptomeningitis with haemorrhagic spots is present over the cerebral hemispheres and a pachymeningitis over the cervical enlargement, with dilatation of the central canal, a periependymal inflammation and sometimes blood-stained fluid in the interior. Coloured plates and good microphotographs illustrate the histological changes.

H. Harold Scott.

LACORTE (José Guilherme). [In Portuguese & English.] A reacção do desvio do complemento na Molestia de Chagas. **The Complement-Fixation Test in Chagas' Disease.**—*Mem. Inst. Oswaldo Cruz*. 1927. Vol. 20. No. 2. In Portuguese pp. 197-210. With 38 figs. on 18 plates. In English pp. 211-224. [3 refs.]

The author performed a complement-fixation test in two hundred suspected cases of Chagas' disease; a Wassermann test was also made simultaneously in all the cases. An account of the technique used is given. The following is a summary of the results:—

"It is our purpose in publishing the present paper to make clear the possibility of diagnosing Chagas' disease by means of the Bordet and Gengou complement-fixation reaction, for the following reasons:—

"1. In 200 cases suspected of being Chagas' disease selected among those attending the hospital at Lassance, the test was practised with 159 positive results, which gives a high total percentage of 79.5 per cent.

" 2. In the cases of the cardiac form 87·2 per cent. of positive results were obtained out of a total of 39 reactions. This is the form which most favours diagnosis whether by this or other means.

" 3. In the case of subjects affected only with thyroid lesions, mostly of goitre, 79·5 per cent. positives were obtained in a total of 119 reactions. It would seem to me that this is a great argument in favour of the hypothesis expressed by the discoverer of the disease, in favour of endemic goitre of this and probably of other regions being caused by *Trypanosoma cruzi*.

" 4. In the cases of the nervous form 100 per cent. positives were obtained in a total of 6 reactions.

" 5. In those of glandular form 75 per cent. positive results were obtained in a total of 8 reactions.

" 6. In those of undetermined form 25 per cent. in 8 reactions.

" 7. All these patients were submitted at the same time to the Wassermann reaction. With serum from the same puncture and under the same conditions except as regards antigen, 17 per cent. positive reactions were obtained. In 13 per cent. both reactions gave positive results. Most of the patients with a positive Wassermann showed evident syphilitic lesions.

" 8. The specificity of the reaction was always evident. In 16 sera of normal subjects, in 2 sera of patients with malaria and in 3 patients with ulcers, influenza and rheumatism, used as control, the reactions were in all cases negative, thus confirming the works of Guerreiro, Machado, Villela and Bicalho.

" The antigen which gave the best results was that prepared with the spleen of a puppy well infected with *Trypanosoma cruzi*, whilst that of spleen and heart proved to be a little inferior."

[It will be noted in (1) of the author's summary that the tests were made upon "cases suspected of being Chagas' disease" and the results are not correlated with the finding of trypanosomes or other proof of the existence of the disease.

In (3) thyroid lesions are first assumed to be due to trypanosome infection and then the fact that many of them gave a positive serological reaction is stated to uphold the assumption. No evidence is given that these goitre cases should not really be counted among the rather scanty controls which would upset the whole argument.]

W. Y.

LAVIER (G.). Particularités du noyau chez les trypanosomes du groupe brucei, d'isolement récent. [**Peculiarities of the Nucleus in *T. brucei* recently Isolated.**].—*C.R. Acad. Sci.* 1927. Dec. 5. Vol. 185. No. 23. pp. 1325–1327. With 1 text fig.

Whilst a member of the International Sleeping Sickness Commission in Uganda, the author had occasion to study a number of strains of trypanosomes belonging to the *brucei* group (*T. gambiense*, *T. rhodesiense* and *T. brucei*) and all recently isolated. Under these conditions the flagellates differ somewhat from the classical descriptions which are often based on strains conserved in European laboratories. In this note the author deals with the nucleus.

The karyosome can be clearly seen by vital staining of the parasite with a solution of pyronin, 1 in 2,000 of normal saline: other dyes reveal the same structure. The author next deals with the posterior displacement of the nucleus, which, he states, is not characteristic of

T. rhodesiense and *T. brucei*, but may also sometimes be seen in *T. gambiense*. He gives a brief explanation of this phenomenon along the lines of a previous paper [this *Bulletin*, Vol. 24, p. 952].

The interesting observation is recorded that in certain conditions of infection in the guineapig trypanosomes were encountered in which there was no nucleus. This was not the result of artefact, the individuals in question were intact and their neighbours were well coloured; moreover, their appearance shows clearly that they were living at the moment of fixation. Their cytoplasm is generally pale and exhibits few, if any, inclusions. They can be encountered easily with a little patience at certain periods of the infection in the guineapig, when the divisional forms are particularly numerous and atypical. These a-nuclear forms have been seen in *T. brucei* and *T. rhodesiense*, but not yet in *T. gambiense*, although Lavier believes they will eventually be found also in infections due to this parasite. Lavier explains this phenomenon on the assumption that in periods of intense division the necessary synchronism in the division of the organism for the production of two complete new individuals may not occur. If there be any delay in the division of the nucleus one of the daughter individuals has no nucleus. Such forms may live for a short period.

W. Y.

LAVIER (G.). Existence d'individus naturellement "ablépharoplastiques" dans les souches de trypanosomes du groupe *brucei* récemment isolées. [**Blepharoplastless Individuals in Strains of *T. brucei* recently Isolated.**]—*C.R. Soc. Biol.* 1927. Dec. 16. Vol. 97. No. 35. pp. 1611-1613. [Internat. Sleeping Sickness Commission, and Parasit. Lab., Faculty of Med., Lille.]

While studying seven recently isolated strains of *T. gambiense*, two of *T. rhodesiense* and four of *T. brucei*, the author has seen in all a certain number of individuals in which the parabasal body was lacking. In other words, to use a bad expression, "blepharoplastless trypanosomes." These forms may occur in the naturally-infected host, but in man the author has never encountered sufficiently numerous trypanosomes to have a chance of discovering them. They are also found in experimental infections whatever the species infected, e.g., dog, guineapig, rat and monkey. In experimental infections they appear a little after the first trypanosomes. Their number then increases rapidly for some days until a state of equilibrium results, which persists indefinitely till the death of the animal. Subinoculation does not increase the number of these forms; on the contrary it may lead to their progressive disappearance. The forms involved may be either short, long or intermediate trypanosomes. They can divide giving rise to blepharoplastless individuals. They do not seem to be influenced by trypanolytic crises more than normal individuals. A certain number of them may result from atrophy of the parabasal body, which, in recently isolated strains, exhibits very great variations in size, but most certainly the greater portion of them are produced during division. In periods of intense division the necessary synchronism for the formation of two complete individuals may be lacking and a retardation of division of the parabasal body may result in two new individuals, one of which possesses a parabasal and the other

lacks it. The point of equilibrium appears to vary not only in different strains, but in the same strain, and blepharoplastless individuals may form anything from 0.5 to 10 per cent. of the total number of parasites.

W. Y.

LAVIER (G.). Sur la structure du corps parabasal des trypanosomes. [**Structure of the Parabasal Body of Trypanosomes.**—*C.R. Acad. Sci.* 1927. Dec. 19. Vol. 185. No. 25. pp. 1534–1535.]

Various researches have shown that the body, in the Herpetomonadidae, named micronucleus, kintonucleus and blepharoplast, is neither of the nature of a nucleus nor a true blepharoplast, but ought to be considered as analogous to the parabasal apparatus of JANICKI in the *Hypermastigina* and *Polymastigina*.

The author's investigations on trypanosomes belonging to the *brucei* group have thrown some light on the structure of this body. In living preparations it is invisible and what one sees is the vacuole which accompanies it; but the parabasal body is easily seen on vital staining. In ordinary dry and wet fixed preparations the general appearance is the same, viz., a strongly chromophilic body surrounded by a more or less pronounced halo. But in preparations fixed with Flemming's solution without acetic acid, treated with bichromate of potash and stained with iron haematoxylin, the appearance is different: the body stained is definitely more voluminous. These observations lead one to consider the parabasal body of the trypanosomes as formed of a chromophilic nucleus, resistant to alcohol and acetic acid, and surrounded by a chromophobe cortical zone extremely sensitive to acids and alcohol.

The true blepharoplast or basal granule is situated in contact with the parabasal body, except at the time of division when it is definitely separated from the parabasal body. In trypanosomes of the *brucei* group the size of the parabasal is extremely variable; sometimes it is very large, but often it is obviously atrophied, and finally in a certain proportion of instances it is completely absent.

W. Y.

LAVIER (G.). Sur la vacuole prébasale des trypanosomes. [**The Prebasal Vacuole of Trypanosomes.**—*C.R. Acad. Sci.* 1928. Jan. 9. Vol. 186. No. 2. pp. 106–108. [1 ref.]

Although the existence of a vacuole in front of the parabasal body has been recognized for a long time and has frequently been figured, but little is known about it. It cannot be an artefact, as it is clearly seen in the living parasite in certain instances when it is of sufficient size. Sometimes it is hypertrophied, bulging the two sides of the trypanosome and lenticular when seen in profile. Often the existence in its interior of a longitudinal filament can be seen, and rarely in place of this filament are one or more granules. All attempts at vital staining proved failures, but after fixation and staining the same appearances were disclosed as were seen in the living parasites. The vacuole itself remains unstained and the axial filament is frequently to be seen; sometimes it is prolonged anterior to the vacuole and reaches as far as

the nucleus and even beyond it. Exceptionally two or even four parallel filaments are present in the vacuole. In contact with the vacuole and applied to its posterior pole is the basal granule. The flagellum, which in part does not traverse the vacuole, but turns anteriorly in its vicinity, is sometimes applied to its surface. The prebasal vacuole is generally round and its size varies considerably independently of that of the trypanosome. During division of the parasite it does not divide, but a new one is developed shortly after the appearance of the second flagellum.

The vacuole cannot be considered as appertaining to the parabasal or as secreted by it, since it is present in "blepharoplastless" individuals. Possibly it is formed by the basal granule, or possibly it is completely independent of this. The author believes that its rôle is secretory, because chromophilic granules often appear at its periphery, and he considers that the variations in its size are due to variations in its activity.

W. Y.

LAVIER (G.). Les formations paravacuolaires des trypanosomes. [**Paravacuolar Formations of Trypanosomes.**].—*C.R. Acad. Sci.* 1928. Feb. 6. Vol. 186. No. 6. pp. 401-403.

Reference is made to the fact that in certain trypanosomes and particularly those of the *brucei* group chromophilic granules occur in the cytoplasm. HINDLE and SWELLENGREBEL showed long ago that, although most of the granules are composed of metachromatin or volutin, a certain number are of a different nature; these are stainable with haematoxylin and are localized between the kinetonucleus and nucleus. In his observations on the character of these granules Lavier found that in blood films, stained by the panoptic method, they stained a purple-violet colour similar to that assumed by metachromatin, from which they could only be distinguished by their localization at the periphery of the prebasal vacuole and especially at its anterior pole. Although, however, they are chiefly paravacuolar they may extend anteriorly towards the nucleus; sometimes they are arranged in a row, but at other times they are grouped in a rosette or scattered irregularly, and at other times again they may be present in considerable number and invade the whole flagellate.

These granules can be differentiated from the metachromatin particles by fixing in methyl alcohol and then immersing in warm water—a proceeding which immediately dissolves the metachromatin. In wet-fixed preparations the metachromatin dissolves in the fixative, whereas the paravacuolar formations persist even in the presence of considerable quantities of acetic acid and are stainable with haematoxylin. Vital staining also allows of the differentiation of the two kinds of granules.

The conditions which determine the appearance of the metachromatin and paravacuolar formation are quite different; for the former the host infected by the trypanosome is important, whereas for the latter this has no effect. They are particularly numerous in those individuals the vitality of which is obviously injured; e.g., in crises which are terminated by cure the trypanosomes may be absolutely crammed with granules. Under these circumstances there is a noteworthy

hypertrophy of the prebasal vacuole. Lavier considers that the paravacuolar formations are secreted by the prebasal vacuole and not, as suggested by HINDLE and SWELLENGREBEL, by the kintonucleus. Possibly these granules are a product of degeneration of the trypanosomes, but it is also possible that they may be a defensive reaction against unfavourable conditions.

W. Y.

ROSKIN (G.) & SCHICHLAJEWA (S.). Die Teilung des Kerns bei Trypanosomen. [**The Division of the Nucleus in Trypanosomes.**]—*Arb. a.d. Microbiol. Inst. d. Volksunterrichtskommissariats.* 1927. Vol. 3. German summary pp. 390–392. [In Russian pp. 163–180. With 6 figs. & 1 plate.]

The process of nuclear division was investigated in *T. equiperdum*, *T. rhodesiense*, *T. evansi* and *T. brucei*. Wet blood films, after treatment with (1) San-Felice, (2) Fleming, (3) Hermann, (4) Zenker, or (5) 1 per cent. osmic acid vapour, were fixed with sublimate alcohol. Thereafter, without allowing the preparations to dry, they were stained with Haydenhain's haematoxylin and counter stained with eosin or chromotrope or by Unna's or Ikeda's method.

In the resting stage the nucleus is round or oval and in the middle of it is the karyosome, the size of which depends greatly on the physiological condition of the individual. The nucleus is separated from the cytoplasm by a delicate membrane within which, on the periphery of the nucleus, the chromatin is grouped in fine granules or forms a narrow border. The karyosome contains no chromatin in the resting nucleus. Before commencement of division the karyosome increases greatly in size and the chromatin from the periphery of the nucleus becomes grouped round it. The formation of the chromosomes then takes place and one is separated off from the enlarged karyosome. Two chromosomes remain for a time unseparated, but finally they likewise are divided off. In this way there arises a nucleus with three chromosomes. The chromosomes, which at first form a triangle, become arranged in a row and successive cleavage from the mother chromosomes gives rise to daughter chromosomes. The daughter chromosomes become distributed in threes on opposite sides of the nucleus which becomes elongated and gradually separated into two segments. The young daughter nuclei contain three chromosomes which fuse together and form a karyosome from which the chromatin passes to the periphery of the nucleus.

W. Y.

NAMIKAWA (Hiroshi). Ueber das Verhalten von Warmblüter-Trypanosomen im Koerper des Seidenwurmes (*Bombyx mori*). [**On the Behaviour of the Trypanosomes of Warm-Blooded Animals in the Body of Silkworms.**]—*Taiwan Igakkai Zasshi (Jl. Med. Assoc. Formosa).* 1927. Sept. No. 270. German summary pp. 8–9. [In Japanese.] [Govt. Research Inst., Formosa, Japan.]

Reference is made to the work of IWANOW (1925) who showed that *T. equiperdum* was still infective for mice after it had been for 11 days in the body of *Galleria melonella*. The author injected silk worms with *T.*

gambienne and *T. lewisi* and kept the silk worms at various temperatures viz., 2°, 4°, 18° and 37° C. It was found that *T. gambienne* remained alive in the silk-worms kept at 2°–4° C. for at least nine days, and that the trypanosomes were infective for mice after three days. *T. lewisi* survived apparently unchanged for at least 8 days in the silk worms and were infective for rats at the end of this period.

W. Y.

KADANER (M.) & WALLON (R.). Un cas de trypanose chez un Européen. *Bruxelles-Méd.* 1928. Jan. 15. Vol. 8. No. 11. pp. 364–366. [4 refs.]

NEAME (Humphrey). Parenchymatous Keratitis in Trypanosomiasis in Cattle and in Dogs, and in Man.—*Brit. Jl. Ophthalm.* 1927. May, Vol. 11. No. 5. pp. 209–216. With 5 text figs. [15 refs.]

MISCELLANEOUS.

TRANSACTIONS OF THE ROYAL SOCIETY OF TROPICAL MEDICINE & HYGIENE. 1927. July 11. Vol. 21. No. 1. pp. 19-38.—
A Discussion. **The Organization of Medical Research in the Tropics.** [Openers: STANTON (A.) & YORKE (W.).]

Dr. STANTON, who opened this discussion, said that the term "research" should cover any work which has for its object additions to knowledge of the causation, prevention or treatment of disease, whether done in a laboratory or in the field. The Divisions of the Medical Department under the control of which research is placed are set out schematically, representing Medical, Sanitary, Laboratories and Research, and Medical Education. Laboratories and Research again is subdivided in 4 headings, which are grouped under a Deputy Director of Laboratory Services in touch with other sciences such as veterinary and agricultural research. The whole is under the Director of Medical and Sanitary Services who is linked through the Governor and Secretary of State with the new Colonial Medical Research Committee, which "will endeavour to establish contacts with all the organizations concerning themselves with medical research problems of the tropics in this country . . . and with international organizations." The medical secretary of this new Committee will link up with it various official and unofficial bodies, such as the Royal Society, Schools of Tropical Medicine, etc., and will devote himself to the study of research in tropical diseases. Reference is made to the possibility of a Colonial Research Service.

Professor Warrington YORKE expressed the opinion that far too much is published and suggested that the output of slovenly work could be remedied by some organization devised to encourage and stimulate original investigation and to afford helpful criticism and guidance. He stressed the truth that work is often rendered valueless by defective organization, e.g., the treatment of trypanosomiasis; careful records are published or the drug treatment of natives but their ultimate fate is unknown. The result is a plethora of papers but little real advance in knowledge. He groups the medical investigators in the tropics under three heads: scientific commissions, staffs of laboratories, and isolated workers whose primary work is diagnosis and treatment of disease; it is to the laboratory staffs that we must look for results of value. Every colony should have at least one thoroughly efficient laboratory, and he is against the separation of routine pathological and research work. He criticizes the method of appointment of the staff of such laboratories. He doubts whether it is generally recognized that specialized qualifications are necessary, and points to the importance of a highly trained, enthusiastic director. Seniority in this respect is a snare and delusion. "The appointment to directorships of laboratories should invariably be in the hands of an expert body in this country." As to the junior posts, those who propose entering laboratory service should spend at least a year working in a laboratory in England learning technique, developing their critical faculties and discovering how research is done. "A man must spend years learning how to investigate successfully." These men should have special study leave at intervals and work in European laboratories. The staff of a laboratory must be sufficiently large to ensure continuity of work; breaks may ruin years of investigation.

Sir Leonard ROGERS gave details of the organization of research in India. Men who put down their names for the Research Department spend several years of probationership before they are confirmed in their appointment.

Professor LEIPER would prefer to the scheme sketched by Dr. STANTON something in the nature of an Imperial Research Service for Agricultural Research with a medical side. If research is subsidiary to the Colonial Laboratory Service, concerned as it is with diagnostic routine, it will remain the Cinderella of the Laboratory. He would like to see medical research associated with education, as in England, and he points out how largely the Medical Research Council depends on the co-operation of University Staffs. "We shall not attain to the ideal of an Imperial Research Service until whole-time research workers, medical, agricultural and veterinary, are grouped together in small communities at a few strategic centres whence selected men can be sent to deal with special problems in the field."

Major-General D. HARVEY gave an account of the organization in the Army.

Dr. MANSON-BAHR in reference to the mass of published papers and its proposed restriction said that MANSON had great difficulty in obtaining publication for his work on filaria and the mosquito. Too great a censorship of medical literature would be an error. He claimed that valuable research work was done in routine laboratories.

Professor C. D. DE LANGEN spoke of the advantage of international organization of medical research; Dr. CHESTERMAN of the opportunities awaiting the researcher in mission hospitals; Mr. M. E. MACGREGOR advocated a communal Field Research Station in the tropics "where new and veteran workers could gain or renew contact with the many problems still clamouring for attention" and Dr. WENYON eulogized the stimulus of competition, individual and international.

A. G. B.

MEGAW (J. W. D.) & GUPTA (J. C.). **The Geographical Distribution of Some of the Diseases of India.**—*Indian Med. Gaz.* 1927. June. Vol. 62. No. 6. pp. 299-313. With 13 maps. [1 ref.]

This paper deals with information supplied, in reply to a questionnaire, by 240 civil surgeons. The object was to collect in a concise form what is known of the geographical distribution of the more important diseases of India and to call attention to the need for a more accurate survey. The authors recognize that the information supplied is more accurate for some diseases than others. Lathyrism, plague, goitre and others are readily diagnosed clinically; disease such as yaws and G.P.I. will be less generally identified, and in other cases the diagnosis will be in doubt, e.g., dengue or sandfly fever, beriberi or epidemic dropsy. They believe, however, that the information is approximately accurate. Malaria and hookworm are not included in this survey. Maps are given of the distribution of relapsing fever, sandfly fever, dengue, kala azar, filariasis and guineaworm; of osteomalacia, lathyrism and endemic goitre; of leprosy, yaws, blackwater fever and Madura foot. The disease areas are indicated by shading as "common," "very common," "rare" and "unknown." [In the absence of the questionnaire it is difficult to say where the different civil surgeons drew the line between common and rare and the scale of the maps is obviously too small to show the natural features of the country.]

Under *relapsing fever* the authors call attention to its absence from Bengal, Assam and Burma and its rarity in Bihar and Orissa. *Sandfly fever* is a disease of the north-west and centre of India. *Dengue* has a wide distribution. Knowledge of the distribution of *filarial disease* is said to be exceedingly meagre; the authors at Calcutta see many cases from a region which according to the civil surgeons is free. Tabulated data are supplied by Sundara RAO for some Provinces. The *guineaworm* records are probably accurate; there is none in Bihar and Orissa or in provinces to the east thereof. With few exceptions *lathyrism* occurs only in a belt running across the Central Provinces, the east of the United Provinces and the north of Bihar. *Endemic goitre* is seen to be commonest in the districts lying immediately south of the Himalayas and in the hilly regions of Burma and Assam. "The distribution favours an agency of a chemical nature [carried in the streams from the mountains] rather than a bacterial infection." *Leprosy* is distributed generally, but is rare in the Punjab and common in Bombay and Burma and Madras; it is estimated that the lepers number 2-3 per mille for all India or a half to one million in all. *Yaws* is depicted in a large area in Assam and Burma, 2 smaller in central India and one in the south. *Diphtheria* is reported as present in 146 districts and absent in 37; in Calcutta it is known to be very common. *Rheumatic endocarditis* is said to be common in 18 districts. Of manifestations of *syphilis* paraplegia and aortic valve disease are the only neuritic or vascular forms which are considered to be common. Locomotor ataxy and G.P.I. "are far less common in India than in most European countries."

Tuberculosis of the lungs is very common all over India; chronic bronchitis with emphysema is common. The information regarding the *dysenteries* is not sufficiently precise to justify analysis. An attempt was made to find out the relation, if any, of *ascites* to dysentery; the replies favoured the view that there is such a relation. *Scarlatina* was reported from 9 districts out of 212. *Stone* is fairly common throughout India; it was returned as unknown in 5 districts only. The *cancer* returns cannot be regarded as accurate, but they do indicate some features of interest. Cancer of the breast, uterus and mouth are frequent almost everywhere. Cancer of stomach is less common; only 8 civil surgeons replied in the affirmative to a question whether they had seen this form at autopsy. Cancer of mouth is commonly attributed to betel chewing. There is tabulated information, province by province, of these forms and of cancer of skin. *Osteomalacia* is fairly common in Bombay, Punjab, United Provinces, and Central Provinces; very rare in Bengal, Madras, Burma and Bihar and Orissa. *Rickets* is more widely spread, but appears to be rare in Bengal, Assam and the Punjab. *Scurvy* is not common except in Bombay and the United Provinces. Of *pellagra* there are 4 doubtful cases from Lyallpur and one well authenticated from Calcutta. *Madura foot* has a wider distribution than was suspected; there seem to be patches of it in most of the provinces. *Climatic bubo* is reported from a few places, including Cawnpore in the United Provinces. The distribution of *exophthalmic goitre* seems to be a "chance one"; young adult females are most commonly affected. Acute *anterior polyomyelitis* is not so rare, the authors say, as the records would suggest. Ten surgeons in reply to a direct query report cases of *sprue* in Indians. *Hydatid cyst* is distributed widely but sparsely over India. *Lupus vulgaris* would appear to be uncommon except in the Punjab and United Provinces;

cases so labelled usually turn out to be something else. ACTON supplies a list of the common *skin diseases* seen at Calcutta in 1926; it is headed by tinea and leprosy.

Readers will agree that "the chief impression conveyed is of the need for a more accurate disease survey of India."

A. G. B.

CALCUTTA. Fourth All-India Conference of Medical Research Workers held at Calcutta on 13th to 16th December 1926.—59 pp. 1927. Delhi: Govt. of India Press.

Fifty-four delegates, collectively representing all parts of India, attended the Conference. After preliminaries, the individual members explained for discussion the general nature of their current researches under the programme for 1926-27. This comprehensive scheme of research included in its scope investigations into cinchona alkaloids and other drugs in the treatment of malaria; the larval characters and the breeding-grounds of *Anopheles*; rat-fleas, Haffkine plague-vaccine; cholera vaccine and other cholera therapy, and the geography of cholera; ankylostomiasis and other helminthological surveys; schistosomiasis in Burma; kala azar and its transmission by *Phlebotomus*; treatment of leprosy, rat leprosy; beriberi and other deficiency and nutrition diseases; tuberculosis tests and bovine tuberculosis; Indian indigenous drugs; maternal morbidity and mortality in childbirth; dysentery; strains of spirochaetes observed in relapsing fever; skin diseases; bacteriology of intra-ocular inflammations; antirabic vaccine experiments; canine tick fever; action of insulin.

Proposals for the programme of 1927-28 were considered. The proposals are on much the same lines as or in actual continuation of those of the previous year; but also include further malaria surveys and *Anopheles* investigations and biochemical studies in malaria; study of the bacteriophage of plague (and cholera); lathyrism; sprue; drug-addiction; blood-changes in kala azar; bacteria of human faeces; transmission of relapsing fever. Certain other items were referred to the Scientific Advisory Board or to other Departments.

The Conference also discussed a statement regarding the Central Malaria Organization for India; the question of the co-ordination and promotion of research; and the co-ordination of research of international importance in connexion with the advisory council of the League of Nations Health Committee. The question of the establishment of an Institute of Nutrition Research—a subject towards which the Raja of Parlakimedi had given a lakh of rupees to the Research Fund Association—was among numerous other matters considered.

Among the resolutions following the subjects discussed at the Conference was one expressing the opinion that the Government of India should establish an organization for the standardizing of drugs issued by the Medical Store Department. The Resolution, passed at three previous meetings of the Conference, urging the Government to appoint a Commission to inquire into the wastage of life and the economic loss in India due to preventable disease was reaffirmed.

A. Alcock.

HOOTON (Alfred). **Medical Relief in Rural India. (Being Part of a Report to the Government of Bombay.)**—*Lancet*. 1927. June 4. pp. 1217-1218.

This report is of special interest as coming from the Acting Director-General, Indian Medical Service. He points out that, as holds good for other tropical countries than India, the regular practitioners, fully qualified on modern scientific lines, are too expensive to be multiplied indefinitely for rural work; some less costly agency must be found. Practitioners of the indigenous systems of medicine, the Ayurvedic and the Unani, are in many instances on the spot, but these systems are based on erroneous theories, and the remedies are largely secret: "To restrict treatment to the methods of the indigenous systems in the light of all the advances of the nineteenth century would be unthinkable." The Japanese have completely broken with the old system, imported from China, and have wholeheartedly adopted modern scientific methods. Moreover, he points out, modern medicine had its birth in the East, and should not be regarded with hostility in India.

The creation of a special class, trained in elementary medicine on modern scientific lines, is considered and the employment of permanent Government servants, such as the primary schoolmasters, on a part-time basis. The last alternative is on trial in Bengal. Thirty men are at work in selected villages in districts including Poona and Bijapur:

"Selected primary schoolmasters are posted for a period of training of two and a half months to civil hospitals where special arrangements are made for them. The men are taught elementary anatomy and physiology as in ambulance classes, and given practical first-aid instruction in medicine and surgery. They work in the wards and out-patient department, and the course is made as practical as possible. At the end of it they are expected to be able to dress wounds and ulcers, to treat sore eyes, and to recognize and treat with simple remedies some of the more important diseases. They are also taught elementary hygiene (ventilation, safeguarding of water-supply, prevention of malaria, etc.). Training is, of course, carried out in the appropriate vernaculars. The cost of training works out at about Rs.72 for each man. The equipment (village aid cabinet) costs Rs.250, and the upkeep of one aid-post comes to Rs.300 per annum inclusive. The scheme is therefore very economical.

"It has proved successful, and the Upacharaks, as they are called, are now in great request wherever they are stationed. In Bijapur, particularly, their work has met with cordial recognition from official and non-official observers, and the village officers and villagers in general are almost unanimously in favour of its extension. Requests are frequently received from villages which have no Upacharaks for aid-posts to be established. A general review of eight months' work, from June 1st, 1925, to January 31st 1926, was taken in the Bijapur district, and the following remarks apply to the ten centres now in operation there. In these ten centres, during the eight months, 31,122 cases were treated. These included malaria, dysentery and diarrhoea, eye diseases, skin diseases, wounds and ulcers, and many other affections. Very favourable reports were received from the collector, the assistant collector, the president of the district local board, and the civil surgeon, amongst others. Equally good accounts have come from Poona, the other district in which the Upacharaks were early established, and it is hoped that a combined report on the whole scheme will shortly be available."

A. G. B.

SCHILLING (Claus). *Arztliche Beobachtungen gelegentlich einer Reise in Süditalien. [A Physician's Notes on a Journey through S. Italy.]—Abhandl. a.d. Gebiet d. Auslandskunde. Hamburg. Univ. 1927. Vol. 26. (D., Med. & Vet. Vol. 2.) [Festschrift NOCHT.] pp. 477–480.*

Dr. Schilling contributes an interesting paper, chiefly on malaria in Sicily and the measures taken to combat it. He notes that on the railway where the measures are most complete (quinine and nets) of 4,443 officials in the malarial zone, 14·6 per cent. had acute attacks of malaria, evidence to the author that, like other infectious diseases, malaria can be kept under, but not eliminated. Anopheles were found breeding in the sulphur mines 100 and more metres below the surface. With regard to the suppression of anopheles breeding grounds he remarks that Italy suffers from two evils: want of coal and over-population. Consequently water power must be used, whenever possible, with the result that dammed up lakes harbour anopheles larvae. In the Clinic for Children in Catania more than 10 per cent. of the admissions have kala azar. All suspicious cases are diagnosed, he tells us, by puncture of the epiphysis of the tibia and withdrawal of marrow. Treatment is by tartar emetic introduced into the jugular vein, the child lying on an operation table with head hanging over the edge, under which conditions the vein stands out clearly. From a small village under Vesuvius come 25 per cent. of all the kala azar cases that reach the Naples Clinic; the transmitting agent is unknown.

A. G. B.

WATSON (A. J.). *Notes on Medical Practice in Yunnanfu.—China Med. Jl. 1927. Nov. Vol. 41. No. 11. pp. 922–930.*

Sixteen years ago a paper on the diseases of this remote province of China by a French author was summarized in this *Bulletin* (Vol. 5, p. 376). Yunnan, which consists of tableland at over 5,000 feet elevation, is now much less remote, since the capital may be reached by railway from Haiphong in three days. Two factors, the author says, are lowering the general health of the community—endemic goitre, which is widely prevalent, and the opium habit, which affects more than two-thirds of the men and one-third of the women. Opium may be purchased everywhere at a lower price than tobacco. At the author's hospital more than 100 cases of poisoning are admitted yearly. In some notes on treatment it is stated that when life is despaired of an injection of lobeline has a dramatic effect.

Typhus is probably the most fatal disease in the province; it is not seen at the capital, but is widespread in the villages. Typhoid fever is quite common and paratyphoid A has been identified. Relapsing fever is of frequent occurrence, as a rule not very severe; it is relieved by 0·3 gm. salvarsan. All three forms of malaria are seen. Leprosy is well established. The out-patient records of the C.M.S. hospital show that nearly 1 per cent. of the 10,000 patients are lepers. Tuberculosis is only second to typhus; the commonest form is pulmonary, but tuberculous peritonitis and tuberculous disease of bones and joints are frequent in children. Acute rheumatism and mitral disease are not uncommon. Epidemic encephalitis is endemic and one of the patients dates his illness back to a period antecedent

to the description of this disease in Europe. In 1927 12 cases of post-encephalitic parkinsonism were seen. Many other diseases receive mention. No case of plague has been seen for many years.

A. G. B.

LECOMTE. L'assistance médicale en Cochinchine pendant l'année. 1925. (Extraits.) [**Medical Relief in Cochin China in 1925. Extracts from Report.**].—*Ann. de Méd. et de Pharm. Colon.* 1927. Apr.–May–June. Vol. 25. No. 2. pp. 167–224.

From this long report dealing largely in matters of local interest some information of more general value can be extracted. [Cochin China has about 4,000,000 inhabitants.]

Principal endemic diseases.—Of surgical diseases *appendicitis*, considered to be very rare in Asiatic races, was seen in 89 natives. Of *stone in the bladder*, of such a character that hospital admission was necessary, there were 94 cases. *Malignant tumours* furnished 539 admissions with 103 operations. At the native hospital there were 29 operations for tumours of the face and tongue, 11 for breast cancer, 9 for malignant tumours of the neck, 7 hysterectomies and 7 operations for cancer of the penis. The hospital now has 542 milligrammes of radium for the treatment of malignant tumours.

Of general diseases *malaria* is most prevalent; 14 cases of *blackwater fever* were seen. Malaria is becoming less prevalent with the advance of civilization. State quinine was distributed in this year to the amount of 249 kilos, of which 73 were sold. It is not practicable to supply quinine for the whole population and its use is mainly restricted to troops, schools, prisoners and the like. *Intestinal parasitism* is widespread, above all *ankylostomiasis*. *Beriberi* accounted for 1,603 admissions with 290 deaths, as against 190 deaths the year before; it is specially frequent on plantations. Three cases of *scarlet fever* were seen. In 1925, it is stated, nearly 11 million litres (2,877,000 gallons) of "pure alcohol" [alcool pur] were consumed (industrial uses included); *alcoholism* is serious in the towns. Of diseases of the eyes *conjunctival affections* come first and *trachoma* second; the former are the chief cause of blindness.

A large number of women are admitted to hospital for confinement, 15,821 in this year, 120 per mille of the total number, with 102 deaths or 0.6 per cent. Infant consultations are multiplying. Umbilical tetanus, formerly one of the chief causes of infantile mortality (3.3 per cent. in 1905), has fallen largely (0.37 in 1925). At Saigon the infant mortality of the first month fell in these respective years from 23.8 to 5.8 per cent., and that of the first year from 33.8 to 12.9 per cent.

In the course of the year 7,274 cases of transmissible disease were reported, including 6,165 cases of *dysentery*, 658 *smallpox*, 65 *cholera* and 23 *plague*. These are the four principal diseases. It is stated that amoebic dysentery is more prevalent than bacillary, but hepatic complications are rare; bacillary dysentery is common in children. Plague is steadily diminishing, partly, it is thought, owing to the preventive measures which are accepted more and more willingly by the natives; 5,384 vaccinations have been done. Cholera has remained stationary in incidence. Its prevention is much more difficult than that of plague. There is always risk of an epidemic in the spring, at the close of the dry season, when the cisterns are empty and recourse for drinking is had to stagnant pools; 10,589 vaccinations were

practised. No case of cholera has been reported in persons regularly vaccinated. The incidence of smallpox gets steadily less; there were nearly a million vaccinations in the year, of which some 375,000 were primary. *Enteric fever* makes little progress; there were 56 deaths from this cause.

The author writes that *syphilis* is certainly less grave than in Europeans; it attacks the bones and skin rather than the more important organs; tabes and G.P. are very rare. The chief danger is the effect on the birth-rate. There is about to be built at Saigon an Institute of Syphiligraphy where the most recent methods of diagnosis and treatment will be practised. Of all the affections which menace the population of Cochin China the most to be feared after malaria is *tuberculosis*. According to researches of the Saigon Pasteur Institute 55 per cent. of the population give positive cuti-reactions. The Municipality of Cholon has set in train a social enquiry, starting with school children and extending to their homes, families and surroundings. At the end of December 5,019 babies had been vaccinated with Calmette's B.C.G. made at the local Pasteur Institute. The vaccines are usually given on the 3rd, 5th and 7th days after birth. It is desirable to reduce this period, since many native mothers will not remain in hospital so long.

A. G. B.

- i. NEDERLANDSCH TIJDSCHRIFT VOOR GENEESKUNDE. 1927. July 16. 71st Year. 2nd Half. No. 3. pp. 335-349. [6 refs.]-Nederlandsche Vereeniging voor Tropische Geneeskunde. Vergadering op Zondag 20 Maart, 1927. [Transactions of the Netherlands Association of Tropical Medicine, March 20, 1927.] [BEIJNEN (G. J. W. K.), Reporter.]
- ii. IBID. July 30. No. 5. pp. 568-582.-Nederlandsche Vereeniging voor Tropische Geneeskunde. Vergadering op Zondag 29 Mei 1927. [Transactions of the Netherlands Association of Tropical Medicine, May 29, 1927.] [BEIJNEN (G. J. W. K.), Reporter.]

i. Three papers were read at this meeting. EIJKMAN reported on the results of experiments with the pure vitamin B of JANSEN and DONATH (see this *Bulletin*, Vol. 24, p. 126 and 607), of which substance he received a small quantity from the authors. Whilst JANSEN and DONATH confined their experiments to tests by which the preventive action of the vitamin was clearly demonstrated, EIJKMAN also proved its curative action, experimenting with pigeons and cocks. Non-specific curative action upon polyneuritis avium is possible by various substances containing no vitamins, but is only temporary. The effect of the pure vitamin proved to be lasting. The addition of 2 mgm. of the stuff to one kilo polished rice was not quite sufficient to protect the animals against polyneuritis, but 4 mgm. absolutely fulfilled this purpose. No reasonable doubt is justified as to the chemical purity of the product.

ELDERS, whose views on sprue as a deficiency disease have been referred to previously (see this *Bulletin*, Vol. 21, p. 705, and Vol. 24, p. 382), was induced by the likeness of sprue and pernicious anaemia to treat the latter disease along the same lines as sprue. MINOT and MURPHY also treated pernicious anaemia with a dietary of which they consider liver to be the active principle; their results are very favourable and in Elders' opinion constitute a support for his theory. He quotes

several cases of pernicious anaemia treated with more or less success with his diet of which raw meat, raw milk and plenty of vitamins are the principal parts.

VAN THIEL read a paper dealing with the morphological differential diagnosis between the strongyloid larvae of *Necator*, *Ancylostoma duodenale* and *Uncinaria stenocephala* (a dog hookworm). This cannot be summarized concisely.

ii. HOOLBOOM gave a description of dhobie itch, "kutu aer" and similar affections of the skin. He quotes cases and discusses etiology and epidemiology. Dhobie itch may be identified with eczema marginatum, for which affection, however, neither in Europe nor abroad can a special fungus be held responsible. "Kutu aer" is a bullous eczema between the toes common in the D.E.I. in workers in swampy places; it is known under other names in other tropical countries. The mycotic etiology of the affection is well established, but is not uniform. The epidemiology of these diseases is rather obscure. The fungi may be more or less ubiquitous and only become pathogenic on the softened, perspiring skin. This, of course, does not exclude an occasional passage from man to man.

SNIJERS considers the paratyphoid A problem and reaches the conclusion that paratyphoid A can get no hold in N.W. Europe, not from immunity of the individuals, but of the community; the tracks along which the disease used to spread are blocked by modern sanitation. Paratyphoid A requires a stronger degree of "faecal community" than does typhoid fever, because the number of patients becoming carriers is relatively smaller and the time during which the bacillus is excreted after clinical recovery is shorter than in typhoid infection.

COENAES read a paper on the use of buffer-solutions in the staining of blood slides after Giemsa. The haematoxylin test of the reaction of the distilled water used for diluting the dye is not a perfectly trustworthy one and the author recommends the use of buffer solutions pH7, which may be kept longer without alteration than distilled water neutralized with soda. For details the original paper must be seen.

W. J. Bais.

BERNARD (R.). La Pastoría de Kindia (Guinée). [**The Pastoría of Kindia, French Guinea.**]—*Bruxelles-Méd.* 1927. Oct. 16. Vol. 7. No. 51. pp. mcdlxxxv-mcdxc. With 2 text figs. [3 refs.]

An interesting account of the great monkey park to which the name of Pastoría has been given. Kindia, which has a station on the railway line between Konakry and the Niger, is 160 kilos from the coast and a great centre for the cultivation of bananas. The institute is in the middle of a concession of 39 hectares, 16 of which are under cultivation. Besides bananas pineapples are grown, which, with rice, milk, biscuits, roast fowls, tea and eggs, form the diet of the chimpanzees; the other monkeys prefer manioc. A herd of cattle serves for the production of rinderpest serum, the control of biological products, the traction of vehicles, and the production of manure; the milk is used partly for the chimpanzees and sick monkeys. The native method of hunting the chimpanzee is described; it leads to the death and injury of many, but has been pursued with energy because of the high price to be obtained in the European market. The export of chimpanzees except for scientific purposes is now forbidden. Better methods of capture are now under consideration, such as a bait of food soaked in alcohol,

of which they are fond—when “dead drunk” they are easily secured; the use of arrows poisoned with snake-venom—when they fall envenomed from the trees they are to be resuscitated with antivenin! Once captured and brought to Pastoria it is found that they are extremely susceptible, even when kept in the open, to the microbes of man, and die in considerable numbers from intestinal affections.

The first experiment made with the monkeys was vaccination for tuberculosis with B.C.G. an account of which was published in this *Bulletin* [Vol. 23, p. 323]. Other researches are in progress, and foreign savants are welcomed at the laboratory.

A. G. B.

LICHERI (A.). Notes de pathologie tropicale. [**Notes of Tropical Pathology.**]—*Ann. Soc. Belge de Méd. Trop.* 1927. Nov. Vol. 7. No. 2. pp. 151–156.

These notes concern malaria and the cuti-reaction for tuberculosis in the native military force at Irebu on the Congo, women and children included. Of 1,100 examined for splenic index in November [details not given] 95 or 8·6 per cent. were positive, and of those 95, 32 showed parasites in the blood (24 subtertian, 8 quartan).

The cuti-reaction was tested in 1,028 instances: 221 or 21·4 per cent. reacted positively. Of 77 children at ages from 2 to 5 years only one was positive. Three tables are given. Two concern the reaction among the black personnel of Europeans, and among men at the end of their term of service. The numbers are too small to give reliable percentages.

A. G. B.

CLEVERS (Marguerite). Hygiène scolaire à Stanleyville en 1925–1926. [**School Hygiene at Stanleyville, 1925–6.**]—*Ann. Soc. Belge de Méd. Trop.* 1927. Nov. Vol. 7. No. 2. pp. 165–169. [Bact. Lab., Stanleyville, Belgian Congo.]

The schools at Stanleyville at this period contained 645 children, 470 boys and 175 girls. The limits of age appear to be 6–14 years. 70·1 per cent. had malarial parasites in their blood, made up of subtertian 62·7, quartan 7, and tertian 0·3 per cent. Two groups, of 76 and 47 pupils, received quinine over a period of 5 weeks, from half to one gram per day. The results were not very clear, and the trials were abandoned.

Of the pupils 38·9 per cent. were infested with intestinal worms, chiefly ankylostomes (24 per cent.) and ascaris (11 per cent.); carbon tetrachloride in 3 cc. doses repeated monthly gave excellent results in ankylostomiasis.

An examination for the cuti-reaction (tuberculosis) gave 41·4 per cent. of positives.

A. G. B.

GRAVELLAT. Le recrutement des troupes indigènes en Afrique occidentale française. [**Recruitment of Native Troops in French West Africa.**]—*Ann. de Méd. et de Pharm. Colon.* 1927. Apr.–May–June. Vol. 25. No. 2. pp. 225–248.

Of 147,000 men eligible for recruitment in 1926, a contingent of 11,000 had to be raised. Details are given of the results of the examinations and the medical reasons for rejection in each of the seven

colonies with data of tribes. These are of local interest. In the general conclusions one observation merits notice. All the medical personnel employed in recruiting agreed that the age of 19 years, fixed by decree of July 1919, is too low and that this accounts for the large number of postponements. At this age the African native has not completed his growth, a failure which the author attributes to the hygienic conditions and poor dietary. Complete development is attained at 22 years and this should be the minimum age for recruitment. The chief causes of rejection were poor development, umbilical hernia, eye affections (chiefly trachoma), venereal diseases, ulcers and faulty cicatrices, cardiac disease (especially in Dahomey), arthritis, dracontiasis and yaws (Ivory Coast), malaria, leprosy, and alcoholism in the coastal regions.

A. G. B.

PHILIP (C. R.). **A Report on a Preliminary Investigation into Morbidity among the Wateita.**—*Kenya and East African Med. Jl.* 1927. Nov. Vol. 4. No. 8. pp. 250-255.

The observations here recorded were made during a fortnight's tour among the 30 to 40 thousand people composing this tribe. In over 600 examined the diseases found prevalent were helminthiasis, yaws, malaria and tuberculosis. Helminthiasis, the author thinks, is responsible for much of the ill-health, round worms and ankylostomes being the chief parasites. The anaemia and "flabby heart" is attributable to the ankylostomiasis and possibly also to ascariasis. In cases suspected of worms it was constantly found that vocal fremitus and vocal resonance were decidedly increased over the lung apex on the right side: this is considered to be a "pulmonary reflex" caused by the passage of immature round worms and ankylostomes through the lungs and to be the probable cause also of the common bronchial catarrh. Groups of 46, 35 and 127 school children between 4 and 15 years were examined. Helminthic infection varied between 52 and 91.4 per cent. In over 400 adults the general nourishment was almost invariably under normal. Anaemia and cardiac murmurs were noted in 64 per cent.; 61 per cent. were considered to have some worm infestation. Of the stools microscopied 50 per cent. contained ascaris, 31 ankylostomes and 12.5 trichuris. Yaws occurred in 39 per cent. Of the 4 groups studied "definite T.B." was found in from 3.25 (adults) to 14 per cent. The school children suffered from dental caries, gingivitis or pyorrhoea in 14 to 41 per cent. of cases and from enlarged tonsils in 12.6 to 23 per cent. of cases. Conjunctivitis and granular lids were frequent among them. Many babies were marasmic because the mother was unable to suckle and no other milk was available.

A. G. B.

PRUM (T.) & VIGONI (M.). **Le travail du médecin itinérant au Congo.** [**The Work of the Itinerant Doctor in the Congo.**]—*Bruxelles-Méd.* 1927. Apr. 24. Vol. 7. No. 26. pp. dcxcxiii-dccxxvi, dccxxix.

The authors' job is to travel in a radius of 30-60 kilos round Leverville to inspect the camps of the Société Anonyme des Huileries du Congo Belge, to look out for sleeping sickness and to give medical assistance to the natives of the concession. For this purpose the Company provides a doctor, a European sanitary inspector (agent

sanitaire), 6 native hospital assistants trained at Kinshasa laboratory, and subordinate personnel. Most of the posts are linked by a steam-boat service, but the doctor's journeys are made over land. Besides drugs and instruments he carries three microscopes, an autoclave and a typewriter. The village to be inspected is reached in the afternoon so that work may be begun about 6 a.m., before the people have dispersed on their daily tasks. All the population presents itself as a rule. A count is made of the men, women and children, they are vaccinated against smallpox and their glands palpated. Statistics are given for the months of April, June and July (diseases with records of less than 10 omitted).

	April.	June.	July.
Number of persons examined and vaccinated	5,463	2,744	5,010
Number of persons treated	666	303	379
Number of consultations	680	311	396
Sleeping sickness	19	10	2
Malaria	12	4	5
Yaws	267	117	53
Filariasis	40	1	1
Diseases of the eyes	6	0	11
Diseases of the ears	20	0	2
Headache from unknown cause	16	0	0
Respiratory diseases (other than pneumonia)	32	8	13
Diseases of the mouth, teeth and throat ...	15	0	1
Ankylostomiasis	23	8	4
Other helminthiasis	21	6	2
Ulcers of the legs	38	11	19
Other skin diseases	56	99	54
Inflammations, boils, abscesses	12	1	9
Injuries	14	5	22
Negative gland puncture for trypanosomiasis	103	45	145
Splenomegaly (blood not examined) ...	18	0	0

It is noted that trypanosomiasis is becoming rarer owing to the treatment employed. It is considered that the headaches and splenomegalies were malarial in origin. Four cases of acute articular rheumatism are noted but without details. Syphilis does not figure in the list, and it is stated that tuberculosis is extremely rare.

A. G. B.

MAASS (Edgar). Zur Pathologie des Liberianischen Hinterlandes. [**Pathology of the Liberian Hinterland.**—*Abhandl. a.d. Gebiet d. Auslandskunde. Hamburg. Univ.* 1927. Vol. 26. (D., Med. & Vet. Vol. 2.) [*Festschrift NOCHT.*] pp. 268–273. [*Missions-Hosp., Bolahun, Liberia.*]

The mission station from which the author writes is at 700 metres elevation three days march from the terminus of the Sierra Leone railway, and was founded in February, 1926. Some details of the character of the country and of the tribes are given. Many cosmopolitan diseases are mentioned. Of these pneumonia does not take the important place that it does on the coast and tuberculosis is rare; the latter is chiefly found among the Mandingos, who are the petty traders.

Malaria is by far the most important disease. The infantile mortality of 500 per mille is, in the author's opinion, almost exclusively due to it. Among 230 children suffering from yaws the splenic index was 71 per cent. Yaws takes the second place. Over 80 per cent. of the admissions were infected. Papillomatous and tertiary forms were about equally prevalent. Rhinopharyngitis mutilans was seen in 15 out of 1,440 cases and twice was associated with goundou. Juxta-articular nodules are frequent. For the treatment of yaws bismogenol was employed with very good results. Leprosy occurs in both forms, especially the nervous; lepers form probably 1 per mille of the population. Of 276 persons examined for intestinal parasites only 8 were free. Ankylostomes were found in 265, ascaris and trichuris in 134 and 117. Figures are given of multiple infestations. Hookworm disease, however, was rare; severe anaemia which could be attributed to hookworms was seen only 3 times.

Schistosoma haematobium is widespread. Of 87 hospital patients, all but 3 admitted for other reasons, 33 were found infested. A large proportion of diseases of women, gonorrhoea apart, is due to schistosomiasis. *S. mansoni* has not been found. Blood filariae are rare, but onchocerca nodules are common and the corresponding microfilariae still more so in excised skin. Nodules on the forehead or temples are fairly frequent. No association with eye disease came to light. No case of human trypanosomiasis was seen. The conclusion is that malaria, yaws, hookworm and schistosomiasis are the most important diseases which call for preventive measures. A campaign against yaws is in preparation. The author refers more than once to BLACKLOCK's publications from Sierra Leone, of which he gives a list.

A. G. B.

BEYERS (C. F.). **Incidence of Surgical Diseases among the Bantu Races of South Africa.**—*Jl. Med. Assoc. S. Africa.* 1927. Dec. 10. Vol. 1. No. 23. pp. 606-612.

The data given in this paper concern 18,000 Bantu in-patients, men, women and children, admitted to the Johannesburg hospital during a period of six years; they are mainly labourers and domestic servants. A table of the surgical conditions found is given, followed by a discussion of the more interesting points.

Surgical *tuberculosis* is, the author thinks, more common among the Bantu than among the European inhabitants of S. Africa; 20 per cent. of the tuberculosis of the Rand is estimated to be surgical, chiefly affecting the lymphatic glands of the neck. Bone and joint tuberculosis is very common, affecting in the order given spine, hip, knee and tarsus. Abdominal tuberculosis is more common than in Europeans; tuberculous epididymitis is common. No case of *lupus* has been recorded.

Syphilis. Twice as many native in-patients give a positive Wassermann as European in-patients, though the Europeans are three times as numerous. The author estimates that one native in three is infected. Surgical syphilis is uncommon. Gonorrhoea is very prevalent, but the common complications do not occur as frequently as in Europeans [no information about stricture]. The author's experience is that the Bantu has a greater natural resistance to *sepsis* than the European. *Ulcers* of the leg are very common and are most frequently

syphilitic. Varicose ulcers are exceedingly rare. *Gall-stones* and *peptic ulcer* are "conspicuous by their rarity;" one case of gastric and three of duodenal ulcer occurred in the period, and one case of gall-stones. The commonest *liver conditions*, excluding carcinoma, were *amoebic abscess* and *hydatid*. *Intestinal obstruction* was common (44 operations); constipation is not infrequent and in 147 cases led to a provisional diagnosis of intestinal obstruction. *Inguinal hernia* is common, but *umbilical hernia* is rare—6 cases. *Dental caries* and *pyorrhoea* are extremely common. *Haemorrhoids* are rare—5 cases. *Appendicitis* is rare. Over 500 Europeans are operated on yearly at Johannesburg, but in this series of natives there were only 80, 50 of which were verified by operation. The average age is higher than among Europeans. The author discusses this subject at some length. *Calculi* are very rare among the Bantu—one vesical and 4 urethral—though *schistosomiasis* is common. *Enlarged prostate* is rare—6 cases. *Variocoele*—no cases. *Gynaecological conditions* are as common as in Europeans. There were 8 cystic adenomas of the *thyroid*, but no case of Graves's disease. *Brain tumours* are rare; hydrocephalus and meningocoele fairly common. Natives recover well from severe fractured skull. Bad compound *dislocations* do extraordinarily well, function being well restored.

Osteomyelitis is common and tends to become chronic. There has been no case of *internal derangement of the knee*. A sub-acute condition of the knee-joint is fairly common, resembling a rheumatic arthritis with periarticular structures swollen and effusion into the joint. In 12 cases examined the author has never found a focus of infection. With a back splint and a course of salicylate recovery is rapid. Of *genu valgum*, possibly related to rickets, there were 4 cases. *Congenital club foot* is fairly common. *Flat foot* is a rare disease—3 cases. "Dr. Fouché, of Johannesburg, informs me that the appearance of flatness is due to the great development of the abductor hallucis." *Prepatellar bursitis* is quite common. Fourteen cases of *ainhum* were seen, all in males. *Varicose veins* are rare; of 8 cases 3 were in multiparae.

The author does not think that, apart from industrial, tuberculous and venereal disease, the introduction of European clothing, diet, and micro-organisms has made any serious difference to the native's health. Certain diseases such as peptic ulcer, gall-bladder conditions, appendicitis, cancer, appear to be just as rare among the civilized as among the raw natives. The information about tumours will be given in the *Bulletin of Hygiene*; of malignant disease there were 106 cases. [Schistosomiasis being common, it is curious that surgical complications which are so frequent in Egypt are not recorded in South Africa.]

A. G. B.

KENNY (Della M.). **Notes on the Training of Native Hospital Orderlies.**
—*Kenya & East African Med. Jl.* 1927. May. Vol. 4. No. 2.
pp. 62-64.

This short paper by the Nursing Sister in charge, Native Hospital, Nairobi, will encourage those who have to undertake a similar task, for after narrating some of the difficulties and disappointments she concludes that "with training and supervision the African who is keen on his work can be made into an excellent nursing orderly."

A. G. B.

MÜHLENS (P.). Beobachtungen ueber die Pathologie von Venezuela und Mittelamerika. [**Observations on the Pathology of Venezuela and Central America.**—*Abhandl. a.d. Gebiet d. Auslandskunde. Hamburg. Univ.* 1927. Vol. 26. (D., Med. & Vet. Vol. 2.) [Festschrift NOCHT.] pp. 361–379. With 14 figs. on 3 plates. [5 refs.] [Inst. for Ship & Trop. Diseases, Hamburg.]

The author reached Venezuela in December 1926, travelled via Colombia and Panama through Central America and left Vera Cruz in Mexico at the end of April, 1927. In the intervals of lecturing he was able to make some observations which he here recounts.

Venezuela.—Malaria is very prevalent. Taking parasitic and splenic indices together they reach in the worst districts 65–100 per cent. Tables show that of 410 persons examined, including many children, from six localities, 46 per cent. were infected, 85 infections being subtertian, 46 tertian, 46 quartan, and 13 tertian+quartan; and that of 546, mostly children, 50·9 per cent. had enlarged spleens, the total combined indices, i.e., parasitic and splenic without parasites, being 59 per cent. A third table, in which the spleens are classed according to projection into the abdomen, in 7 classes, shows that projections of a hands-breadth and more were quite common. In one place all of 64 examined had the spleen enlarged. The author comments on the proportion and the size of the enlarged spleens, which were such as he had not previously encountered. Kala azar, he says, does not come in question. In by far the greater number of subtertian infections crescents were present.

Some account is given of other diseases prevalent in Venezuela. Leg ulcers were excessively common, but little could be ascertained as to their nature. He was struck by a peculiar disease of the foot which he figures; it resembles Madura foot but is different. It is not a manifestation of yaws, for no yaws was seen. There and in Central America cases of "mossy foot" came under observation. These are described and figured. Two pieces of tumour were excised and the reports on them by ROCHA LIMA are given; in neither case were parasites or mycelium discovered. Night blood examination of 74 dock labourers at Puerto Cabello showed 14 to harbour *Microfilaria bancrofti*, but none showed symptoms of filarial infection. Of 19 Germans examined at the same port all were free.

Passing over Costa Rica, Salvador and Guatemala, where few observations were made, we come to *Mexico*, where the author was able to make an expedition into the interior. He notes that the sanitary state of Tampico has greatly improved of recent years. The malarial mortality, formerly 95 per 10,000, has progressively decreased and in 1925 was 14, while the total mortality has come down from 49 per mille in 1921 to 27·9 in 1926; it is calculated that 5,224 lives have been saved in those five years. Children were examined in two schools on the outskirts of Tampico; of 170 only 7 had enlarged spleens, in 6 instances slight; it is noted that this was not the malarial season. No malaria cases were found in either of two Tampico hospitals. He found anopheles breeding in small numbers and especially among the leaves of the floating islands of water lilies in the large lagoons and floating collections of water plants, such as *Ceratophyllum*, *Cabomba* and *Potamogeton* known as "Granillas." These water lilies play a great part as breeding places and are extremely difficult to deal with. In Vera Cruz also malaria has much diminished. Many examinations

for malaria were made and recorded for small groups in various parts of Mexico. Of other diseases pinta or carate was frequent. There are 14 photographs of characteristic disease conditions.

A. G. B.

PINO POU (R.). Notas para la geografía médica de Venezuela. Enfermedad de Chagas en Barinitas. [**The Medical Geography of Venezuela. Chagas's Disease in Barinitas.**]—*Gac. Med. de Caracas*. 1927. Mar. 15. Vol. 34. No. 5. pp. 65-66. With 1 text fig.

Malaria and hookworm infection exist in Barinitas as causes of anaemia and debility, but cases with these symptoms were met with which could not be thus explained. Many of the children exhibited marks of insect-bites and the author collected specimens of *Rhodnius prolixus* and had them examined. They were reported to contain evolution forms of *Trypanosoma cruzi*. Further examination of the children showed that myxoedema was fairly frequent also and it is concluded that Chagas's disease is widespread in the district.

Other diseases are casually mentioned, carate, tuberculosis and syphilis. There are a large number of biting-flies—mosquitoes, tabanids, phlebotomus, and others.

H. Harold Scott.

HEES (Hermann). Epidemiologie und Praxis im Camp. Studienberichte aus Guatemala. [**Epidemiology and Camp Practice in Guatemala.**]—*Abhandl. a.d. Gebiet d. Auslandskunde. Hamburg. Univ.* 1927. Vol. 26. (D., Med. & Vet. Vol. 2.) [Festschrift NOCHT.] pp. 173-176. [Guatemala Plantations Ltd.]

The author, who appears to be in the employ of Guatemala Plantations Ltd., states that dysentery and malaria were so severe on these coastal plantations in the first rains that he was commissioned to study and report upon the camps. The diseases he discusses chiefly are amoebic dysentery, malaria and helminthic infections. No evidence is given that the dysentery is amoebic. He associates it with the water supply and plagues of flies and says that the labourers preferred yatren to emetine. Ninety per cent. are said to be infected with ankylostomes. Other diseases are touched on, and it is stressed that whoever would improve the sanitation must first carefully study the habits and customs of the country.

A. G. B.

MENK (W.). Infektionskrankheiten im Küstentiefland des Departamento Magdalena von Columbia S.A. [**Infectious Diseases in the Coast Lands of Magdalena, Colombia.**]—*Abhandl. a.d. Gebiet d. Auslandskunde. Hamburg. Univ.* 1927. Vol. 26. (D., Med. & Vet. Vol. 2.) [Festschrift NOCHT.] pp. 333-344. [1 ref.]

This paper concerns Santa Marta, the chief port of Magdalena, and the country behind it where are the bananeries of the United Fruit Company. It is noted that the rainfall is low and the dry season prolonged, so that the plantations are watered by irrigation, and that the races are so mixed that it is not possible to reach conclusions on racial pathology: The best survey of the prevailing diseases of this region is to be obtained by studying the reports of the United Fruit Company, which treats annually about 18,000 persons, but it is

noted that these consist for the most part of adult males. The table gives useful information. The low mortality for lung tuberculosis is due to the fact that such patients become incapable of work and are discharged from the Company's service.

Disease.	Percentage of all hospital cases.	Percentage of case mortality.	Percentage of all cases of death.
1. Malaria	18.6	0.9	4.3
2. Amoebic dysentery	8.0	1.1	2.2
3. Other causes (injuries, etc.)	7.7	3.6	6.6
4. Ankylostomiasis	6.3	0.	0.
5. Pneumonia	5.4	31.8	44.2
6. Influenza	5.2	0.	0.
7. Venereal Diseases	4.1	0.6	0.6
8. Ulcerations—Leg Ulcers ...	3.5	0.	0.
9. Cellulitis and acute abscesses	3.4	0.6	0.6
10. Lymphatic diseases	2.5	0.	0.
11. Hernia	1.7	1.2	0.6
12. Lung Tuberculosis	1.2	10.4	3.3
13. Typhoid and Paratyphoid ...	1.1	13.5	3.8

Diseases which do not find a place in this table are polyneuritis (of beriberi type), splenomegaly with anaemia, liver abscess, hepatitis and catarrhal jaundice, all of which are frequent.

Malaria is not so prevalent here as in other parts of the tropics, owing to the low precipitation; in 1923 20 per cent. of hospital patients had it; in 1924 (a wet year) 34 per cent., but if the possessors of large spleens are added the percentage becomes about 61. The blood examinations showed 58 per cent. subtertian, 37 per cent. tertian and 2.7 per cent. quartan [in these figures no children are included]. Blackwater fever is rare, one to three cases are seen yearly.

The author compares the small proportion of entries for amoebiasis with the figure of 53.7 per cent. obtained by KOFOID for *E. histolytica* found in the stools in the same year at Santa Marta [see this *Bulletin*, Vol. 24, p. 2]; in the majority of cases symptoms are absent. He has seen neither lung nor arthritic complications.

The pneumonia which causes such a large percentage of deaths is mostly pneumococcal. All four types occur. *Pneumococcus septicaemia* is the cause of many rapidly fatal cases without marked symptoms. Typhoid and paratyphoid come next to pneumonia. From the combined results of blood culture and the Widal reaction in 1925, of 51 cases 78 per cent. were typhoid, 12 paratyphoid B and 8 per cent. paratyphoid A. A systematic stool examination revealed enteric bacilli in 18 per cent. of all patients admitted. Bacillary dysentery is of fairly frequent occurrence, but much less so than amoebic. *B. dysenteriae*, Groups II and III, were identified but not Shiga-Kruse. Venereal diseases accounted for 4.1 per cent. of admissions, of which about half were for syphilis. A series of 1,000 cases in which the Wassermann reaction was tested showed 23 per cent. strongly positive and 3 per cent. positive. Of males over 45 [number not given] 35 per cent. were strongly positive. The author suggests that these high figures may be accounted for by attacks of yaws in childhood.

The chief groups of skin diseases were leg ulcers (53 cases, with 23 per cent. W.R.+) and the group caused by fungi, chief of which is pinta or carate; 10 per cent. of patients from inner stations suffer from this complaint. The author states that of 67 patients with well-marked carate no less than 70 per cent. gave strong positive Wassermanns.

The percentages of the commoner intestinal worms were high, but symptoms due to hookworm (75 per cent. harbourers) were rare. Albumin and casts were found in the urine of 25 per cent. of 483 hospital patients; acute nephritis and definite nephroses are, however, rare. In about 5 per cent. of all ward cases neuritis, polyneuritis and disturbance of tendon reflexes are observed; all stages up to definite beriberi are seen; wet beriberi is, however, rare.

Splenomegaly with anaemia and liver cirrhosis was seen in 2½ per cent. of ward cases; this is usually regarded as malarial, but the author thinks that it calls for investigation.

Diseases noted as absent from this region are—relapsing fever, yellow fever, cholera, typhus, schistosomiasis, *Filaria bancrofti* infection and scarlet fever.

A. G. B.

JANTZEN (Walter). **Post-Mortem Summary.**—*Fifteenth Ann. Rep. Med. Dept. United Fruit Company, Boston, Mass.* 1926. pp. 186-189.

During the year 1926 72 autopsies were performed in the Truxillo Railroad Company Hospital, Puerto Castilla, Honduras; 57 were Latin-Americans, 11 negroes and 2 each East Indians and Caucasians, all under 35 years. There were 23 cases of lobar pneumonia, which was responsible for more deaths than any other disease; pneumococci were always found in the diseased tissues. Lesions of the central nervous system were found in 5 cases (3 pneumococcic meningitis). Kidney diseases were present in 6 instances, 3 the interstitial type of chronic nephritis; systematic microscopic examination would have revealed more renal disease. Three deaths were from malaria, and four from blackwater. Eight bodies showed syphilitic changes. Carcinoma was found twice, sarcoma once. Cirrhosis of liver was found thrice. Twelve patients died of external violence. The author comments:—

"Only 7 out of 72 of the deaths autopsied were due directly to malaria or diseases related to it (principally blackwater fever). There is undoubtedly, however, a lowered resistance caused by repeated attacks of malaria as well as by intestinal parasites, which no doubt unfavourably influence the course of pneumonia and other diseases that come to autopsy. Uncinaria infection is present to some degree in practically all patients, although it was not the cause of death in any case autopsied.

"The enlarged spleen so commonly found at autopsy, often of enormous size, is probably caused by repeated attacks of malaria. In a great number of these cases, malarial pigment is found in the spleen and the bone marrow. These changes were found principally in Latin-Americans, in contrast to the negro race, which seems more resistant to malaria."

"Tuberculosis, although a common disease here, has received little discussion, inasmuch as patients are encouraged to go to a more suitable climate as soon as this condition is diagnosed."

A. G. B.

GAGE (Alfred). **The Machete versus the Microbe in Central America.**—*Fifteenth Ann. Rep. Med. Dept. United Fruit Company, Boston, Mass.* 1926. pp. 205-212.

In this paper, from Quirigua Hospital, Guatemala, the author comments on the low resistance of the peons or mozos to acute infections and contagious diseases, particularly pneumonia, and, on the other hand, their remarkable resistance to terrific wounds from firearms and cutting and piercing instruments. In many cases of pneumonia the mozo died when an Anglo-Saxon would probably have survived, while in many instances the native bore with impunity wounds such as a person of the other race would have succumbed to rapidly. The mozos take measles badly, but the mortality is low. In influenza the incidence of pneumonia is higher than in U.S.A. A table shows that in 1925 20·8 per cent. of all hospital deaths were caused by lobar pneumonia, and 6·5 per cent. by broncho-pneumonia, and that the fatality rate was 33·9 per cent. The author notes in explanation of the rate of fatality that many patients are admitted in an advanced stage of disease having been strongly purged, that most are poorly nourished and suffer from malaria and intestinal parasites, and that they have a poor myocardium and often valvular murmurs due to anaemia.

A description is given of the wounds to which the mozos are liable, mostly from the machete, a razor-sharp knife, two or three feet long; many entail the loss of brain substance. Their resistance is high except to wounds in and about the knee joint, where the percentage of purulent arthritis is very high. Two factors which, in the author's opinion, give a partial explanation of the resistance to these extensive lesions of the tissues are—the low degree of shock present and the fact that they are usually drunk when the wounds are inflicted.

A. G. B.

SHATTUCK (George C.). **The Present Status of Tropical Medicine in the United States. Presidential Address.**—*Amer. Jl. Trop. Med.* 1928. Jan. Vol. 8. No. 1. pp. 3-8.

Though it would seem hardly necessary in this *Bulletin* to quote passages supporting the necessity for the study of tropical disease, this view is not held in all quarters, and it may be useful to give Dr. Shattuck's opinion. He says:—

"There are those who seem to feel, either because no large group of diseases is confined exclusively to the tropics or because the usual laboratory methods can often be used for investigations of tropical diseases, that instruction in tropical medicine, as such, is superfluous. It seems to me that this view is unsound in that it ignores practical needs and essential facts."

"The practice of tropical medicine is an outgrowth and an extension of the general medicine of the temperate zone but it demands a superstructure of special knowledge and experience not easily acquired. Moreover, the application of preventive medicine in the tropics requires special knowledge of tropical disease and of conditions of life in the tropics, and requires, at times, special methods for applying hygienic principles."

The whole address is a plea for adequate special training for those doctors who are to work in the tropics.

A. G. B.

LAVINDER (C. H.). **Comment on Tropical Diseases of Interest in New York City—a Brief Review.**—*Bull. New York Acad. Med.* 1927. Sept.–Oct. 2nd Ser. Vol. 3. Nos. 9, 10. pp. 563–575.

This, a description of diseases of warm climates which might be seen in New York, has no special interest for us. The diseases discussed are the quarantinable infections—cholera, yellow fever, smallpox, typhus, leprosy and plague; malaria, especially the potentially dangerous subtertian form; amoebiasis and liver abscess; beriberi, pellagra and sprue; tularemia and undulant fever; Weil's disease and dengue; hookworm and clonorchiasis; climatic bubo.

VERGELY (Auguste). Quelques notes sur la pathologie brésilienne. [**Notes on the Pathology of Brazil.**]—*Jl. Méd. de Bordeaux.* 1927. Sept. 25. Vol. 104. No. 18. pp. 687–696.

A discursive address from a surgeon who has practised for many years in the State of S. Paulo. Information is given of the diseases met with.

A. G. B.

DENNY (C. R.) & NICHOLLS (Lucius). **Melioidosis in a European.**—*Ceylon Jl. Sci.* (Sect. D. Med. Sci.). 1927. Mar. 16. Vol. 2. Pt. 1. pp. 37–40. With 1 text fig. [6 refs.]

This disease has not been recorded before from Ceylon, and the fact of its occurrence in a European of good social position suggests the possibility of its being commoner than is supposed.

Clinically the diagnosis is difficult. In this patient there were pleuritic symptoms but no cough. These symptoms subsided, to be succeeded in 3 days by rise of temperature, diarrhoea, and enteric-like stools. Profuse night sweats and a septic type of temperature were marked features of the illness, which terminated in death 6 weeks from the commencement. It was found, however, that the patient had had slight fever for 2 or 3 weeks previously. Agglutination tests with organisms of the typho-coli group were negative, as also were blood films for malaria. One of the blood cultures developed a thick pellicle growth which was regarded as a contamination but was probably a growth of *B. whitmori*. That a diagnosis was made was due to the fact that some yellow pus had been withdrawn in a syringe when making exploratory puncture for empyema shortly before death. The pus gave a growth of *B. whitmori* and cultures, inoculated into guinea-pigs, showed caseation at the site of inoculation, peritonitis, enlarged spleen dotted with caseous areas, caseous areas in the liver, inflammatory patches in the lung and characteristic enlargement of the testicles with caseous degeneration.

Although *B. whitmori* is pathogenic for rats, and human infection may be acquired from them, this organism has, at all events, not been recognized in the thousands of rats examined in the course of plague work.

W. F. Harvey.

PONS (R.) & ADVIER (M.). **Melioidosis in Cochin China.**—*Jl. of Hyg.* 1927. Mar. Vol. 26. No. 1. pp. 28–30. With 1 chart in text.

STANTON (A. T.) & FLETCHER (William). **Melioidosis. Notes on a Culture of *B. whitmori* from Saigon.**—*Ibid.* pp. 31–32.

—, — & SYMONDS (S. L.). **Melioidosis in a Horse.**—*Ibid.* pp. 33–35. [2 refs.]

These three papers add to our knowledge of the disease melioidosis which has been so fully worked out by Stanton and Fletcher. Up

to the year 1925 it had only been reported from Rangoon, Kuala Lumpur and Singapore. It was thought unlikely, however, that this limitation was anything but accidental. In the first of the three papers we have an account of a case of the septicaemic form of the disease in a woman who died in Saigon. The causative organism, a short bacillus, motile and Gram-negative, *B. whitmori*, was isolated and the authors confirm the resemblance of its growth to *B. mallei*. It was very pathogenic to all laboratory animals and is comparable in this respect with *B. pestis*. The woman is held to have contracted the infection from an animal and not a human source. In the second paper an account of the biological characters and pathological effects of the strain isolated at Saigon is given. Two types of colony appeared on eosin-methylene blue agar, one of which was the ordinary rugose type, the other ultrarugose and very sticky. The organisms of both types of colony fermented lactose, saccharose, glucose, mannite, dulcitol, maltose and dextrin but without gas. No indol was formed. The ordinary type of colony was agglutinated to full titre by immune serum, whereas the ultrarugose type only agglutinated to 33 per cent. of full titre. The Saigon strain is the most virulent of those hitherto isolated. In the third of the three papers the resemblance of melioidosis to glanders and the points which differentiate *B. whitmori* from *B. mallei* are referred to. The disease has been observed in man, rats, cats, dogs, guineapigs and rabbits, but the case here described is the first occurrence in a horse which has been reported. *B. whitmori* was isolated on several occasions from the intermittent purulent discharge from the nose and the serum of the affected horse agglutinated the type strain in 1-8,000, whereas that of 7 unaffected animals in the same stable did not give a titre above 1-200. The horse had been imported into the Malay States from Australia, and had to be destroyed 18 months after the first isolation of the causal organism from the nasal pus. At the autopsy no active lesions were found and *B. whitmori* was not isolated from the organs.

W. F. Harvey.

ROMITI (C.). **Surgical Treatment of Elephantiasis, being a Report to the Surgeon General of British Guiana.**—*Davson Centenary Fund, British Guiana. Theses submitted for the Award of the Gold and Silver Medals for the Triennial Period 1923-1926.* 15 pp. [n.d.] Printed by Waterlow & Sons Ltd., London.

In this paper, which deals exclusively with elephantiasis of the lower extremity, the author, after a reference to the different types of case enumerated by LEIPER in his report on filariasis in British Guiana, recommends surgical intervention in those cases in which enlargement of the limb is permanent. The only contra-indications for operation, apart from general constitutional considerations applicable to all surgical cases, is the presence of ulcers, septic dermatitis, or local infection of any kind. Complications such as these must of course be dealt with before operative measures are undertaken. Dr. Romiti operates under spinal anaesthesia by stovain, and practises a modification of KONDOLEON'S procedure, which aims at reducing the bulk of the affected structures, and maintaining this reduction by the establishment of free communication between the superficial and deep tissues. He operates first on the outer side of the limb, removing a broad,

but not too broad, wedge of skin and subcutaneous tissue, and resecting from the whole length of this incision a strip of deep fascia half-an-inch wide. To obviate any possibility of union taking place between these cut edges of aponeurosis they are "inverted and sutured at the bottom of the incision." A second operation with the same technique is carried out on the inner side of the leg some ten to fifteen days later. The whole procedure is simple and rapid, and the risk to the patient negligible.

The author discusses the anatomico-pathological changes in the integuments met with in cases which have come under his observation, and propounds several questions with regard to their aetiology which he hopes to be able to answer after more detailed pathological investigation. He appends an interesting and valuable table giving details and particulars of 45 cases operated on by the method described. Three of these were still under treatment when the report was submitted, but in 42 (in 12 of which both legs were dealt with) the immediate results were manifest and could be regarded as eminently satisfactory. Further investigation is promised, after a suitable lapse of time, with a view to ascertaining how far these good results may be regarded as permanent.

J. J. Pratt.

CONNELL (W. K.). **Elephantiasis of the Male External Genitalia.**—*Tanganyika Territory Ann. Med. & San. Rep. for the Year ending 31st December, 1926.* pp. 114-115.

A brief communication in which the author advances two methods of treatment of the denuded penis after radical excision of the elephantoid scrotum, his object being to provide the organ with a covering of whole-thickness integument in preference to having recourse to skin-grafting.

In the first or "Tunnel" method the penis is drawn through a four-inch subcutaneous tunnel on the inner aspect of the thigh, the edges of the divided preputial mucosa being stitched to the skin edges of the distal end of the tunnel. The base of the organ is covered by approximation of the flaps used to cover the testes. After three weeks, when healing is complete, the penis is freed from the thigh by an incision marking out lateral flaps of size suitable for the provision of skin clothing for the mobile organ, the steps necessary to close the wound left in the thigh being at the same time taken. An excellent result is said to have been attained in the one case to which this procedure has been applied.

In the second or "Granulating Flap" method, a flap about two inches wide and at least 10 inches long is dissected up from the thigh, and replaced and fixed in its original bed by sutures after sterile gauze has been placed underneath it. Three weeks later the distal end of this flap is obliquely divided, the whole flap is again raised and applied to the distal portion of the granulating penis like a roller bandage, only one turn being, however, taken on this occasion. After another fortnight the proximal end of the flap is severed and the process of bandaging the penis with skin completed. During this fortnight's interval it is necessary to keep the patient trussed up, with legs and thighs bandaged together and fixed in a position of flexion on the abdomen. The author has operated in this way successfully in two

cases, but notes that the ultimate cosmetic result is poor, that there is some risk of sepsis, and that the method has many disadvantages. To the reader these will be obvious.

J. J. Pratt.

OLIVARES (Rafael). Elefantíasis de escroto. Tumor de 50 kilogramos, operado y curado en un moro de la zona de Melilla. [**A Case of Elephantiasis of the Scrotum in a Moor cured by Operation.**]—*Rev. Española de Med. y Cirug.* 1927. Dec. Vol. 10. No. 114. pp. 707-713. With 8 text figs.

A case of elephantiasis in a Moor, aged 46 years. Symptoms were noticed some 8 years prior to his coming under the author's care. The tumour was very large, weighing 50 kgm. Operation for its removal, performed under spinal anaesthesia, is described in detail, the sites of the incisions being well shown in a diagram. The penis was found intact, not sharing in the growth, and the testes with the tunicae vaginales were also unaffected. The result was excellent.

The condition before and after operation is clearly shown by photographs. It was probably of filarial origin, but this was not proved.

H. Harold Scott.

LOTTI (C.) & PUXEDDU (E.). Ulteriori ricerche sul favismo. [**Further Researches in Favismus.**]—*Sperimentale*. 1927. Oct. 14. Vol. 81. No. 4. pp. 415-448. [30 refs.] [Inst. of Med. Path., R. Univ., Cagliari.]

Favismus is the name given to the syndrome of anaphylactic nature with haemoglobinuria resulting from inhalation of the perfume of the flowers or from ingestion of the green seeds of the bean.

Two years ago, one of the authors (LOTTI) produced haemoglobinuria in rabbits by intravenous injection of an extract of the plant [this *Bulletin*, Vol. 23, p. 231]. *In vitro* it produced marked agglutination of erythrocytes but not haemolysis. The flowers were found to produce the anaphylactic symptoms without haemoglobinuria, while the dried seeds acted as haemolytic agents and had but little anaphylactic effect; the green seeds combined both properties.

Only a certain number of the experimental animals suffered from haemoglobinuria, which appeared to result in part from the toxicity of the seeds depending on the degree of their ripeness, and in part on the individual susceptibility of the animal injected.

If to the fresh juices of the plant inactivated human serum is added the haemolytic effect is not increased *in vitro*; if, however, a substance (such as histamine) having a selective action on the vessels is added, haemoglobinuria occurs in rabbits previously sensitized, but not in fresh animals.

Several series of experiments were set up to demonstrate these points and protocols are given of these, together with those of control experiments to eliminate other possible factors.

The last part of the paper is of a chemical nature showing the modifications of the calcium and potassium present in the serum resulting from the anaphylaxis and from the haemoglobinuria. The amount of calcium, according to the estimations, varies between wide limits in the rabbit, namely, 11.2 and 22 mgm. per cent., with an

average of 16 mgm. ; the potassium between 19.25 and 29.37 with an average of 26 mgm. per cent., and the K:Ca quotient between 1.15 and 2.40, with an average of 1.61.

Intravenous injection of the extract of the plant leads to an increase in the potassium, though transitorily. It is inferred that the anaphylactic shock and the haemoglobinuria have the same basic cause, an alteration in the pH in the blood-plasma, though there are other factors at present unknown. These plasma changes may have some bearing on the production of haemoglobinuria in malaria.

H. Harold Scott.

TORRES (C. Margarinos). Sobre uma nova entidade morbida do homem, caracterizada por meningo-encephalo-mielite, myosite e miocardite aguda diffusa congenitas, associadas a presena, nos respectivos tecidos, de um novo parasito, *Encephalitozoon chagasi*, M. Torres, 1927. [*A New Disease in Man, characterized by Meningo-Encephalo-Myelitis, Myositis and Acute Diffuse Congenital Myocarditis, with a New Parasite Encephalitozoon chagasi in the Tissues.*]—*Brasil-Med.* 1928. Jan. 7. Vol. 42. No. 1. pp. 1-4. With 10 text figs. & 4 figs. on 1 plate. [158 refs.] [Oswaldo Cruz Institute, Rio de Janeiro.]

A child died, 2 days old, at the Maternity Hospital in Rio de Janeiro. The only symptoms during life were a persistent contracture and, shortly preceding death, generalized convulsions. At the autopsy, numerous opaque yellow foci, the size of rice-grains, mostly discrete but some confluent, were seen in the brain, both in the grey and white matter. Microscopically, intracellular bodies like those denominated *Toxoplasma* and *Encephalitozoon* were found aggregated as in the "cysts" of *Trypanosoma cruzi*, each constituent being ovoid, staining red with eosin and enclosing a single granule staining blue with haematoxylin; there was nothing of the nature of a blepharoplast visible. They were found in the neuroglia cells and, in addition to the brain, were present in the cells of the subcutaneous fat, the striped fibres of the myocardium and skeletal muscles. In each aggregation there were about 15 elements in the cells of the subcutaneous fat; in the brain were some with 12 and others with as many as 70. In the myocardial cells the "cysts" measured about 31 by 10 microns and contained 60 bodies or more. The largest were in the skeletal muscles, 41 by 10 microns, containing 100 to 150 of the bodies. The cytoplasm stains uniformly, the nucleus is very small (1 micron) but the periphery takes on a deeper stain as if there were chromatin granules in a nuclear membrane.

They were not found in the spleen, liver, kidneys, or thymus. Sections of the brain and spinal cord revealed small inflammatory foci similar in size and structure to those of Chagas's disease and experimental toxoplasmosis; these were made up of mononuclear cells, but not distributed particularly round the vessels.

The author discusses the question of the congenital source of the condition and compares it with Chagas's disease; invasion may be directly through the chorionic villi from maternal infection. Examination of the blood of the mother two months after the death of the infant showed anaemia, with a colour index of 0.7 and a relative monocytosis of 25.5 per cent.

H. Harold Scott.

HAHN (E. Vernon) & GILLESPIE (Elizabeth Biermann). **Sickle Cell Anemia. Report of a Case greatly improved by Splenectomy. Experimental Study of Sickle Cell Formation.**—*Arch. Intern. Med.* 1927. Feb. 15. Vol. 39. No. 2. pp. 233-254. With 8 text figs. [16 refs.]

From these comprehensive and instructive studies, which are largely and fruitfully experimental, the authors come to regard the phenomenon of sickling of the red cells observed in sickle-cell anaemia not as itself a disease—since it is consistent with good health and long life ; but as signalizing a congenital predisposition to haemolytic anaemia.

Their studies are based on the case of a negro boy of four years whose symptoms were all explicable on the ground of severe anaemia, except for attacks of epigastric pain. All things considered—including adequate evidence from the laboratory—the case might have been set down as acquired haemolytic jaundice, except for the increased resistance of the red cells. Diagnosis was finally established when typical sickle cells developed in sealed wet blood smears kept for 24 hours at room temperature—and reverted to a circular form in two weeks. Splenectomy was followed by rapid improvement of symptoms, but the sickle-cell trait persists. Pieces of the fresh spleen pulp were fixed at once, some in formaldehyde, and some in Zenker's solution ; in the former when subsequently examined the red cells were elongate, or filiform, or crescentic ; in the latter they were of normal appearance. From these significant observations, confirmatory of other observers, the authors conclude that " the sickle cell is not a distorted cell produced as such by the erythropoietic tissue," but is a distortion dependent on circumstances. In investigating the nature of the tortive circumstances they were guided by an observation which suggested that oxygen tension was a promising line to follow. The following are their conclusions and inferences :—

" 1. The red corpuscles of persons with the ' sickle cell trait ' are transformed into sickle cells *in vitro* as a result of asphyxia. The transformation takes place when the oxygen tension falls below a partial pressure of 45 mm. of mercury, provided the hydrogen-ion concentration is within certain limits probably always on the acid side of pH 7.4.

" 2. The sickle distortion is a reversible phenomenon. Oxygen and carbon monoxide induce restoration of the discoid form.

" 3. All of the facts relating to sickle cells are consistent with a hypothesis that the sickle form is stable when the hemoglobin is dissociated, and that the discoid form is stable when the hemoglobin is combined.

" 4. The influence of hydrogen-ion concentration in the sickle reaction is probably related to its influence on the dissociation of oxyhemoglobin.

" 5. Sickle cell formation *in vivo* is probably induced or increased by anoxemia.

" 6. Disease of the heart and lungs probably plays an important rôle in causing excessive hemolysis when it occurs in persons with the sickle cell trait.

" 7. Reasons exist for believing that the only specific cause for active sickle cell anemia is the unique hereditary anomaly of the red corpuscles which predisposes to it . . .

" 9. The spleen probably plays a secondary rôle in the excessive hemolysis of active sickle cell anemia and is damaged in the process, passing through stages of enlargement to ultimate atrophy.

" 10. The influence of the spleen is not the cause of the sickle cell trait."

The authors propose the terms "drepanocyte," "drepanocytaemia," and "drepanocytic-anaemia," respectively, for "sickle cell," "latent sickle-cell anaemia," and "active sickle-cell anaemia."

A. Alcock.

GRAHAM (George S.) & McCARTY (Sarah H.). **Notes on Sickle Cell Anemia.**—*Jl. Lab. & Clin. Med.* 1927. Mar. Vol. 12. No. 6. pp. 536-547. With 4 text figs. [14 refs.]

This is an excellent, philosophic discourse upon sickle-cell anaemia—a condition for which the authors propose the term "meniscocytosis" [a term that comes into competition with "drepanocytaemia," proposed by HAHN and GILLESPIE, and may therefore be not free for general acceptance]. Most of the matter is now familiar—the race-limitations, the heritage, the inherent latency, the physical and clinical phenomena, etc., and the general resemblance to haemolytic jaundice except in the increased, instead of diminished, resistance of the red-blood cells to haemolysis. The authors emphasize the frequency of latency; among 608 negro patients of all descriptions they discovered its existence in 54 instances. They also note an inconsistency with long life; of 58 cases only 2 were over 50 years of age. They have studied 4 cases *post mortem*, and find in all four common evidence of an abnormal rate of destruction of red blood cells. In their conclusion they regard "meniscocytosis" as a condition—a "demonstrable stigma of an inheritable blood dyscrasia" predisposing to a characteristic anaemia-syndrome; and a "warning signal" of a susceptibility to infectious disease, particularly of the respiratory tract.

A. A.

HEIN (Gordon E.), McCALLA (R. L.) & THORNE (G. W.). **Sickle Cell Anemia. With Report of a Case with Autopsy.**—*Amer. Jl. Med. Sci.* 1927. June. Vol. 173. No. 6. pp. 763-772. With 4 figs. on 2 plates & 1 chart. [17 refs.]

After five pages of general introduction to the subject the authors describe their own observations of a case of sickle-cell anaemia in a negro of 20 years who eventually died (a year after leaving hospital) of a perforating duodenal ulcer. The patient, whose mother also exhibited the "sickling" phenomenon, had always been jaundiced, had suffered intermittently from pains in various joints since infancy, and later in life had leg ulcers (and also periodic fits of epigastric pain, with vomiting). When admitted to hospital he had fever, jaundice, and epigastric pain, an enlarged heart, and a loud apical systolic murmur. When first examined 90 per cent. of the red blood corpuscles sickled in 24 hours. *Post mortem*, the heart was "approximately twice normal size, the enlargement chiefly in the left ventricle," and "extreme splenic atrophy and general signs of increased haemolysis were prominent features."

A. A.

STEWART (Walter Blair). **Sickle Cell Anemia: Report of a Case with Splenectomy.**—*Amer. Jl. Dis. Children.* 1927. July. Vol. 34. No. 1. pp. 72-80. With 3 text figs. [18 refs.] [School of Med., Univ. of Pennsylvania & Univ. Hosp.]

The patient in this case is a male child between 5 and 6 years old who appears to have been sickly and weak since the age of 5 months.

The father is a healthy white man with normal blood. The mother is white but with the features and the dark skin of a Cuban; slight sickle-cell formation was observed in her blood. Neither parent is aware of any negro in their pedigree. There are four other children (all girls) one of whom has slight sickle-cell formation.

The patient seems to have been in the hands of physicians pretty constantly since the age of 5 months, and to have had his blood critically examined pretty frequently, but it was not until he was more than 5 years old that sickle-cells were observed.

At the age of 16 months the spleen and liver were observed to be enlarged and all the palpable glands except the epitrochlear. At the age of $2\frac{1}{2}$ years the diagnosis of pernicious anaemia was made. At 4 years he was under treatment for acute pain in the upper part of the abdomen, and tender ankles; both the spleen and the liver had now *decreased* in size; enlarged tonsils and adenoids were removed. Subsequently, at intervals, crops of macules resembling pityriasis appeared, and the abdominal pain recurred. Finally, when the sickling was observed, the spleen was removed, since the patient had been ill all his little life and continued to suffer from secondary infections at frequent intervals. But two months afterwards, although recovery from the operation was rapid, the general condition shows little change and the sickle formation continues.

The removed spleen weighed only 46 gm.; the malpighian bodies were just visible. Microscopically, the "intense congestion of both pulp and sinuses masks most of the other features except for a peculiar fibrosis and localized calcification. The malpighian bodies are much diminished in size. There is extreme calcification of the smaller and larger vessels. There are distorted scarred areas, with much haemosiderin."

A. A.

IEVERS (C. L.). **Note on the Treatment of Ulcers.**—*Tanganyika Territory Ann. Med. & San. Rep. for the Year ending 31st December, 1926.* pp. 102-103.

Premising that ulcer is one of the commonest incapacitating conditions from which Africans suffer the author describes his treatment, which is a modification of that recommended by a Danish surgeon. The general treatment is that appropriate to syphilis, yaws, ankylostomiasis, food deficiency or whatever condition is found to predispose to or cause the ulcer.

"1. When the patient presents himself with a foul sloughing ulcer the sore is thickly dusted with powdered potassium permanganate which, with the serum of the wound, forms a black paste. The wound is bandaged and left for three days and the patient is given 20 grains of potassium iodide daily. He is warned that the pain will be great; but hardly ever removes the dressing. All patients are given an iron and arsenic tonic as a routine and only rarely is it necessary—in cases of extreme anaemia—to give an intravenous injection of neokharsivan.

"2. When the dressing is removed the wound will be wonderfully improved. It may be necessary to complete the 'toilet' of the wound by removing pieces of sloughing skin or tendon under chloroform; but this is not usual.

" 3. The patients then undergo the following routine treatment daily : Each is given 20 grains of potassium iodide and half an hour later they are placed sitting in a row the ulcers being covered with plain gauze which is kept soaked in potassium permanganate solution (1-500)—the bottle passing from hand to hand. This is done for two hours, the ulcers are then exposed to sunshine for one hour, and afterwards treated with a dry dressing. The following morning the treatment is repeated.

" 4. As a rule the results are very good indeed under this treatment, the wounds rapidly contract in size and begin to granulate. A brisker treatment is instituted for those that seem to lag and they are stimulated with iodine and dressed with B.I.P. ; but the permanganate routine treatment continues in all cases.

" 5. When the wounds are clean, healing and contracting, but hollows remain to be filled up they are treated with normal saline on the gauze each morning for two hours, instead of permanganate, and moist dressings instead of dry.

" 6. A certain percentage of the ulcers, owing to the large area of skin destroyed, require to be skin grafted. This is always advisable as the soft skin of the grafts breaks up the hard scar area and probably prevents subsequent cracking and " breaking down." The permanganate and potassium iodide routine treatment is now discontinued. The skin grafts—shavings from the thigh—are easily put on ; the dressings should be left for four or five days—in spite of the smell—before they are removed and in 90 per cent. of cases some of the grafts at least will have taken and will rapidly hasten healing under simple ointment or moist boracic dressings.

" I may add that it is advisable during the rains to cover the dressings with strips of banana leaves which have been smoke dried and treated with an antiseptic, as the patients will not stay in bed and soil their wounds and dressings walking in the mud—to which dirty element banana leaves are almost impervious."

A. G. B.

REMLINGER (F.). Sur la fréquence à Tanger de l'hématurie dite essentielle. [**The Frequency at Tangier of So-called Essential Haematuria.**—*Bull. Soc. Path. Exot.* 1927. Dec. 14. Vol. 20. No. 10. pp. 989-991. [1 ref.]

The author has been at Tangier since 1911 and has followed up several cases of haematuria for 15 years without the development in the subjects of tuberculosis, cancer or stone. He has seen about 12 cases, only 2 of which were in women. The blood is so evident that the patients themselves—men of 20-50 years—make the diagnosis. There are none of the usual antecedents to haematuria and no pain nor malaise of any kind. The blood is of renal origin. There are no parasites nor micro-organisms. In 24 or 48 hours the bleeding stops and the patient resumes his vocation, and in only two instances has there been a recurrence. The author refers to a paper by D'ANFREVILLE (1915) on haemorrhages in Morocco in which it is stated that, apart from tuberculosis, patients at Rabat with a " congesting tendency " produce blood-stained sputa at the hottest time of the year. The author has not observed any relation between haematuria and season or meteorological events. Other kinds of haemorrhage do not appear to be commoner at Tangier than elsewhere. [The nationality of the patients is not given.]

A. G. B.

SEYFARTH (Carly). Ueber Hodgkinsche Krankheit (Lymphogranulom) mit periodischen Fiebersteigerungen. [**Hodgkin's Disease with Periodical Rises of Temperature.**]—*Abhandl. a.d. Gebiet d. Auslandskunde. Hamburg. Univ.* 1927. Vol. 26. (D., Med. & Vet. Vol. 2.) [Festschrift NOCHT.] pp. 517-531. With 6 charts. [34 refs.] [Med. Clin., Univ., Leipzig.]

Seldom, if ever, does a case of Hodgkin's disease run its full course without pyrexia and recurrent bouts may give rise to difficulties in diagnosis.

Three cases recently observed by Seyfarth are cited in which periodic attacks of pyrexia were noted. Two had definite and palpable enlargement of lymph glands, while the temperature charts, which are reproduced, show the periodic rises of temperature with regular intervening span.

The initial stages of the disease are remarkably uniform. The majority of the patients complain of fever, rigors, weakness, emaciation, fatiguability and night sweats, and often added to these are digestive disturbances, diarrhoea, constipation and, more rarely, vomiting. In these pyrexial forms of Hodgkin's disease the gradual painless enlargement of the cervical lymph glands seldom forms the earliest sign. The periodic and striking rises of temperature are by far the most characteristic. Ten or even twenty of these regular pyrexial attacks have been recorded. The temperature curves in the many recorded cases are scarcely compatible; generally speaking they last 10-14 days with a somewhat shorter intervening apyrexial interval. ROSENTHAL and others have recorded typhoid-like charts of continued pyrexia lasting three to four weeks. On the other hand, short sharp malaria-like temperatures of one to three days' duration have been described.

In Seyfarth's first case a five-day fever alternated with seven days apyrexia, but generally there is a recurrent type of undulant fever. During the fever the patient feels ill and suffers from headache, pains in the back and limbs, and drenching sweats. A typhoidal state may supervene or delirium or even coma; while during apyrexia all symptoms may disappear. These recurring attacks undermine the patient's strength. With each fever attack the anaemia becomes more severe, the spleen enlarged and the swelling of the lymph glands more noticeable. There are cases, as in the first of the present series, in which no noticeable lymphatic enlargement was noted, thereby making the diagnosis difficult, or even impossible. This form of Hodgkin's disease can therefore be divided into two main groups, one with palpable enlargement of external lymph glands, the other in which the internal sets are affected, and which can progress to a fatal termination without any external inkling of what is taking place. Generally speaking, however, some enlargement of the supra-clavicular or axillary group is noted prior to a fatal termination.

The enlargement of the tracheo-bronchial and mediastinal lymph glands can be ascertained by percussion or by skiagraphy. The mesenteric, retroperitoneal and lumbar glands and those at the portal fissure are the most difficult to recognize. The liver is generally moderately enlarged and the spleen is palpable, but sometimes the enlargement can be ascertained solely by percussion. In children, especially, the spleen may reach to the symphysis. Haemic murmurs are present in the cardiac area, and the pulse is generally accelerated.

The skin, as PEL originally remarked, shows a distinct sub-icteric tint; generalized icterus is common towards the fatal termination. On blood examination a progressive secondary anaemia is noted, while the onus of blood destruction falls on the haemoglobin. Usually there is a moderate leucopenia (3,000–5,000), but sometimes a moderate leucocytosis is noted.

The duration of the illness to a fatal termination varies within wide limits; on an average it lasts 15 months up to four years. The ætiology is at present quite undetermined, while the differential diagnosis has to be made from undulant fever, relapsing fever, malaria, typhoid and paratyphoid, kala azar, sepsis, ankylostomiasis, leukaemia, tuberculosis, abdominal sepsis and tumours.

Therapeutic measures are on the whole of little avail. X-ray therapy seems to check the disease for a while and arsacetin is the most useful drug.

P. H. Manson-Bahr.

MONTPELLIER (J.), CATANEI (A.) & COLONIEU (L.). La glossite de Jamin; étude clinique et remarques étiologiques à propos de cas observés à Alger. [*Study of Glossitis of Jamin seen at Algiers.*] — *Bull. Soc. française Dermat. et Syph.* 1927. July. No. 7. pp. 471–475. With 1 fig. [6 refs.]

— & COLONIEU (L.). Une nouvelle glossite, la "langue de Jamin." — *Rev. Prat. Malad. des Pays Chauds.* 1927. Oct. Year 6. Vol. 7. No. 10. pp. 510–521.

In 1925 JAMIN described under the term "stomatite d'automne" cases of a peculiar glossitis seen in Tunis during the preceding eight years. Similar observations were made by NOGUE, MATHIS and GUILLET at Dakar (this *Bulletin*, Vol. 22, pp. 982; 983). The present authors relate their experiences with the same affection seen in Algiers. Their description of the disease differs in no material point from that given by previous authors. Cultures on Sabouraud medium gave in six out of twenty cases a *Monilia*, four of which had the same characters as a fungus recently isolated from a case of thrush invading the tongue; one differed in culture reactions and a fourth was comparable with *M. albicans*. In discussing the aetiology reference is made to the associated gastro-intestinal symptoms found by some observers but not present in the cases now described; the chemical factor due to chewing was also absent and there was no seasonal variation. The disease is considered to be due not to the fungus but some infection as yet unknown.

H. S. Stannus.

STA. CRUZ (J. Z.). **The Pathological Incidence of Lobar Pneumonia in the Philippine Islands.**—*Jl. Philippine Islands Med. Assoc.* 1927. May. Vol. 7. No. 5. pp. 162–170. [8 refs.] [Coll. Med., Univ. Philippines, Manila.]

The summary and conclusions of this paper, the observations in which are supported by five tables are, in part, as follows:—

"1. In 12,000 autopsies performed in the City Morgue of Manila during a period of eighteen years, 400 were primary lobar pneumonia cases, an average of one lobar pneumonia case for every 30 autopsies. The overwhelming majority of the cases were Filipinos.

" 2. There were cases of lobar pneumonia every year and almost every month, but the increased seasonal death rate in this country coincides with the cold north-east monsoon and is due mostly to the extreme cold and the abrupt daily changes of temperature during the period from December to March. Although epidemic of lobar pneumonia is not known in the Philippines, epidemics of influenza can greatly affect the mortality from pneumonia, as shown in the records for 1918.

" 3. The greatest susceptibility as well as the greatest mortality of lobar pneumonia can be said to occur between the ages of 11 and 40 years; the disease is more than twice as common in men as in women. Lobar pneumonia cannot be called the "friend of the aged" in the Philippines.

" 4. The right base is affected in the majority of the cases but it is not so severe or so frequently fatal as is the hepatization of the left base. Pericarditis is often the complication of the left base. Apical pneumonia of the right side was rather frequent in this series; it occurred in all ages without showing predominance in children. Massive pneumonia of the right base is more frequent and the mortality is higher than in that of the left."

A. G. B.

DUYCK. Traitement des pneumococcies par injections hypodermiques de liquide d'épanchement pleural. Note préliminaire. [**Treatment of Pneumococcus Infections by Hypodermic Injections of Pleuritic Fluid.**—*Bull. Méd. du Katanga*. 1927. Oct. Vol. 4. No. 3. pp. 87-93.]

It is found that natives acclimatized to the Katanga, Belgian Congo, contract pneumonia, whereas recruits from Ruanda-Urundi, when they come down from their mountains to the Tanganyika plain, are virgin soil for infection and react to the pneumococcus, like young children to the tubercle bacillus, by blood generalization. Both groups, however, appeared to benefit from the treatment described. Pleuritic fluid is withdrawn by syringe in the 4th or 5th intercostal space in the right anterior axillary line or the left posterior axillary, with the patient's assistance by his forced inspiration and expiration. About 10 cc. are thus extracted for two or three times and re-injected under the skin. About 100 injections have been made with no untoward result. Of 27 cases of pneumonia treated exclusively by this method all did well but one, and in this case treatment was too late. It is essential that it be undertaken early; the size of the dose matters little. Of 18 patients with pneumococcal septicaemia all recovered. Each received one, two or three injections of 1-10 cc. The diagnosis was based on the discovery of the pneumococcus in the blood by culture or in the cerebrospinal and pleuritic fluid. The author thinks it premature to draw any definite conclusion from these figures.

A. G. B.

MARSHALL (Harold K.). **Influenza in Fiji.** [Correspondence.]—*Jl. Amer. Med. Assoc.* 1927. Dec. 17. Vol. 89. No. 25. pp. 2133-2134.

Dr. H. K. Marshall, who in the influenza epidemic of 1918, was a member of the medical service of Fiji, gives some interesting instances of the effectiveness of isolation of communities against infection. While British Samoa was ravaged by influenza, American Samoa, 60 miles away, port from port, with efficient quarantine, remained free. The island of Rotumah, 200 miles north of the main Fiji group,

escaped because communication was interrupted for three months. The Makogai Leper Asylum, Fiji, of which the writer was in charge, on a small island 14 miles from the nearest port, Levuka, with 400 population escaped entirely till August, 1919, though to obtain supplies trips were made to infected Levuka.

A. G. B.

DONNISON (C. P.). **Observations on Some Cases of Displaced Heart in the African Native.**—*Kenya & East African Med. Jl.* 1927. Nov. Vol. 4. No. 8. pp. 241-247.

In the course of examination of labour recruits cases were encountered where the cardiac impulse was displaced outwards or outwards and downwards. In 9 months' observation 16 such cases were noted; three had aortic incompetence, in one there was enlargement with myocardial failure, in two adherent pericardium and fibrosis of lung. In the remaining ten there was no obvious cause and it is this group which is here studied. All were African males, between 15 and 45, of good physique and apparently healthy (other age periods and females were not under examination). Five had been at work on farms or railway and had satisfactorily completed their contract. All came from one of two districts on the shore of Lake Victoria. The outward displacement varied between $4\frac{1}{2}$ and $5\frac{1}{2}$ inches from the mid-line and in six the impulse appeared in the 6th space. Percussion showed that the cardiac dullness was not increased upward or to the right. X rays were not available. A careful examination with the patient in various positions indicated that there was no enlargement of the heart, only displacement. In 8 cases auscultation revealed that the second sound at the mitral and aortic areas was slightly accentuated; bruits were noted in 2 cases. The pulse showed nothing unusual. In every case there was enlargement of spleen to two or three fingers below the costal margin, or more. Of 7 blood examinations 3 showed subtertian parasites. A running test indicated that the heart was not affected in function.

The author discusses possible causes, noting the enlarged spleens, the malarious localities from which the men came, and the malarial infection of some, and concludes that "it is exceedingly difficult to find any suitable explanation for the condition." It appears to involve no serious incapacity and the subjects were passed for any but very heavy manual labour.

A. G. B.

ROEGHOLT (M. N.). Het genito-rectale syndroom. (Het ulcus molle als oorzaak van elephantiasis labiorum, praeputii clitoridis en olitoridis, ulcus recti en strictura recti, strictura vaginae; en een enkele maal van elephantiasis penis en scroti). [**The Genito-rectal Syndrome.**]—*Nederl. Tijdschr. v. Geneesk.* 1928. Jan. 7. 72nd Year. 1st Half. No. 1. pp. 15-25. With 17 figs. on 1 plate.

This article concerns the same subject of tropical surgery which the author has already dealt with (see this *Bulletin*, Vol. 24, p. 151), but now he considers from the same point of view several genital and rectal affections, which he joins together as the genito-rectal syndrome. The soft chancre with its abundant discharge and its

tendency to spread along the lymph channels is considered to be the common cause of these affections. Cultures from open ulcers did not succeed, but from closed bubonic abscesses Ducrey's bacillus was cultivated and inoculation into the skin of a patient of scrapings from her own rectal ulcer caused a typical *ulcus molle*. Four cases are quoted in some detail and the figures illustrate the various affections which the author deals with and which are actually very common in the Malay. The different anatomical conditions and the greater obstacles to treatment of the primary sore in women give an explanation of the prevalence of the genito-rectal syndrome in the female.

W. J. Bais.

HUGHES (T. A.) & SHRIVASTAVA (D. L.). **Observations on Tropical Cirrhosis of the Liver with Special Reference to the Fragility of the Red Blood Cells.**—*Indian J. Med. Res.* 1927. Oct. Vol. 15. No. 2. pp. 427-435. With 4 text figs. [28 refs.] [King Edward Med. College & Mayo Hosp., Lahore.]

"The observations upon which this paper is founded were made in the Mayo Hospital, Lahore, on a series of cases some of whom showed enlargement of the spleen and liver or enlargement of the spleen only, while others had cirrhotic livers with or without splenomegaly. One group gradually merged into the other, so that it is probable that both conditions resulted from different degrees of the same pathological process. All the patients had a history of chronic malaria with irregular bouts of fever, and coming from the Punjab were presumably infected from childhood. The non-cirrhotic cases were all more or less anaemic, the anaemia being of a secondary type with leucopenia, and showed evidence of increased blood destruction by the presence of urobilinuria and hyperbilirubinaemia. Many of those admitted during the fever season (October and November) suffered from irregular pyrexia in hospital, but no malarial parasites were found in the peripheral blood. None were jaundiced and none had haemorrhages."

The relation to malaria is discussed. The conclusions are as follows:—

"1. A condition beginning with splenomegaly and leading to enlargement and eventually cirrhosis of the liver is described as occurring in persons subject to repeated malarial infections.

"2. In this early stage of the condition there is generally increased fragility of the red blood cells in hypotonic saline solutions.

"3. In advanced cases this fragility disappears and there may be increased corpuscular resistance."

A. G. B.

LICHTENSTEIN (A.). Een geval van haemolytischen icterus (type Hayem). Onderzoekingen en beschouwingen naar aanleiding daarvan. [**Case of Haemolytic Icterus. Consideration of its Etiology.**—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1927. Vol. 67. No. 3. pp. 369-379. [15 refs.]

The paper describes a case of haemolytic icterus in a Javanese soldier. The symptoms, which were classical, were as follows: Icterus, enlarged spleen, bilirubinaemia without bilirubinuria, urobilin in urine and faeces, fragility of erythrocytes. Notwithstanding his condition the patient's heavy duties were carried out without inconvenience. The disease had undoubtedly been acquired for less than two years previously he had

been passed for military service. The patient refused splenectomy and returned to duty. A later examination showed no change in the condition except for an increase of red blood cells and haemoglobin.

C. M. Wenyon.

PHELPS (B. M.) & MALLORY (F. B.). **Toxic Cirrhosis and Primary Liver Cell Carcinoma complicated by Histoplasmosis of the Lung.**—*Fifteenth Ann. Rep. Med. Dept. United Fruit Company, Boston, Mass.* 1926. pp. 115–123. With 5 text figs. [4 refs.] [Truxillo Railroad Co. Hosp., Honduras & Path. Lab., Boston City Hosp., Boston, Mass.]

"A report is made of a case of toxic cirrhosis of the liver which gave rise to a primary liver-cell carcinoma, and which was complicated by a terminal broncho-pneumonia due to *Histoplasma capsulatum*, the fifth reported case of this disease as far as known.* The organisms were found to be strongly Gram-positive, and by the use of the aniline-blue connective tissue stain, were shown to possess very definite capsules which remained behind in the phagocytic cells after the death of the parasites."

A. G. B.

MACQUEEN (John). **Four Cases of Tetanus following Intramuscular Injection of Quinine.**—*Lancet.* 1927. June 18. pp. 1289–1290.

These cases, in adult males, occurred in Haifa in the year 1925. The salt used was the bihydrochloride in 50 per cent. solution recently prepared and sterilized in the autoclave. The injection was made into the glutei, the skin being prepared with 3 per cent. tincture of iodine. Needles and syringe were boiled and needles boiled again between injections. The incubation periods were 27–28 days, 21 days, and 11–12 days. All infections were acute and ended fatally. Other patients injected from the same bottles remained well. The author believes that the infecting spores were introduced at injection, and thinks that these cases provide a further argument in favour of the oral as compared with the intramuscular route. [He does not mention the intravenous route.]

A. G. B.

SICÉ (A.). Notes sur la lymphangite endémique dans le sud de Madagascar. [**Endemic Lymphangitis in the South of Madagascar.**]—*Bull. Soc. Path. Exot.* 1927. May 11. Vol. 20. No. 5. pp. 422–426. [3 refs.]

This paper is based upon 5 cases, two of which were acute and followed attacks of bubonic plague and three chronic, with attacks at long intervals, in which a streptococcus was isolated. These last read like filarial lymphangitis; examination of both day and night blood did not reveal microfilariae and there was no eosinophilia. The author has found filaria (*F. bancrofti*) in three south Madagascar

* *Histoplasma capsulatum* was described by DARLING from the viscera of a patient in Panama. "It has been suspected that the parasite may be a yeast-like organism." (STITT.)

patients, but he notes that the three patients came from Reunion and Mauritius, where symptoms were first noted. He doubts the role of filaria in endemic (or tropical) lymphangitis.

A. G. B.

IBRAHIM (Ali). **The Relation of Funiculitis to Hydrocele in Egypt.**—*Lancet*. 1927. Aug. 6. pp. 272-274. [4 refs.]

Cellulitis of the spermatic cord is a fairly frequent condition in the East. The author has found it common in Egypt, for during the four years 1921-1924 105 cases were admitted to hospital at Kasr-el-ainy and about twice as many were treated as out-patients. Nevertheless they represent a very small percentage of the total incidence of the disease which is frequently so mild and of such short duration that hospital advice is not sought. It occurs most usually between 15 and 30 years of age. Three varieties are recognized, (1) gangrenous, (2) suppurative and (3) non-suppurative. These three types are carefully described. Repeated attacks almost always produce hydrocele and funiculitis may be regarded as the chief cause of the idiopathic hydroceles so prevalent in Egypt. The author considers that the effusion in the tunica vaginalis as result of the permanent obstruction of the testicular lymphatic drainage following one or more attacks of funiculitis, resembles the elephantiasis as the end result of repeated attacks of lymphangitis, the underlying cause in both being probably a filaria and the exciting cause a form of streptococcus.

R. T. Leiper.

MACKENZIE (Louis H. L.). **Lathyrism in the Gilgit Agency.**—*Indian Med. Gaz.* 1927. Apr. Vol. 62. No. 4. pp. 201-202.

A propos of McCARRISON's paper on Lathyrism in the Gilgit Agency [this *Bulletin*, Vol. 24, p. 676] the author says he was in Gilgit from 1921-1924 and in his last year became aware of the existence of the condition. A scout was referred to him for examination as to fitness, on the ground that he had the symptoms of a well known local disease, paralysis of the legs, which is considered incurable, and hence is not seen in hospitals. The disease occurs in males and is attributed to the eating of "gharash" grown in newly cultivated land; after some years' cultivation the poisonous property disappears. The author saw about a dozen cases. The symptoms were spasticity of legs and thighs, with good general health. A specimen of "gharash" sent to Major CHOPRA was identified as *Lathyrus sativus*. These cases occurred some 25 miles from the place described by McCARRISON.

A. G. B.

YOUNG (T. C. McCombie). **A Field Study of Lathyrism.**—*Indian J. Med. Res.* 1927. Oct. Vol. 15. No. 2. pp. 453-479. With 9 figs. on 4 plates. [8 refs.] [Summary appears also in the *Bulletin of Hygiene*.]

A field study of lathyrism in certain selected areas in Central India. The report contains a detailed account of the clinical features of this

disease but is particularly valuable on account of the careful study made of the agricultural, economic and food habits in the areas studied. These are too detailed to be summarized and only some of the most important conclusions can be mentioned. Discussing two causation theories which have been advanced the author finds no evidence that germination of the lathyrus grain occurs or that an imported grain is the offender and that there is no evidence of the formation of a poisonous amine formed in connexion with germination. The second theory, that the symptoms are due to contamination of *Lathyrus sativus* by the weed *Vicia sativa*, he finds also to be devoid of foundation in the area of his investigations.

Lathyrism is due to an excessive predominance of the legume *Lathyrus sativus* in the diet, but this is not the whole of the problem. Lathyrism is pre-eminently a famine-year phenomenon, it is one of the pains and penalties of poverty and malnutrition. In such a year the other crops fail and only the lathyrus grows. The people are ill-fed and half starved and in that condition the bulk of the population has to live chiefly on the lathyrus and on such imported grains, largely composed of lathyrus, as they can obtain. Three months of such diet brings an abundant crop of lathyrism cases, beginning in July and continuing till the resumption of a better balanced diet in September and October. In a year of normal rainfall only those whose circumstances of life approximate to famine conditions acquire lathyrism and the striking feature of a pre-lathyrism diet, apart from the preponderance of lathyrus, is the absence from it of the protective vitamins, notably fat-soluble A. In an area in which lathyrism is particularly prevalent, the deficiency disease "night blindness" is also notoriously prevalent. In a Mohammedan village using as much *Lathyrus sativus* as their Hindu neighbours, but supplementing their diet by substances which tend to restore the dietary balance, lathyrism is unknown.

The author puts forward the following view: "It may tentatively be suggested for experimental verification that lathyrism may be to some extent a deficiency disease which is produced in persons living in a state of nutritional instability on a diet noticeably lacking in vitamin A, by a prolonged ingestion of a legume, the amino-acids of whose proteins are unsuitable as a diet and perhaps specially harmful, which is itself deficient in fat-soluble A."

The ultimate causes of lathyrism are economic and the author discusses various expedients to improve the economic status of the inhabitants.

W. G. Savage.

SAMPOERNO & SOETEDJO. Over het voorkomen van het amyloid in Indië [**The Occurrence of Amyloid Degeneration in the Dutch East Indies.**—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1927. Vol. 67. No. 4. pp. 574-578. [7 refs.] [Dutch Indies Med. School, Soerabaja.]

The authors assert that, contrary to the common opinion, amyloid degeneration is not very rare in the Malay. By systematical investigation in approximately 2,400 post mortem examinations they found amyloid degeneration in 20 cases. These are presented in tabular form. There appears to be some increase in its prevalence, which possibly

may be ascribed to the relative preponderance of chronic diseases amongst the causes of death in recent years. In only one case had there existed clinical evidence of amyloid degeneration.

W. J. Bais.

DORÉ (G. R.). Ictère hémolytique splénomégalique chez un hérédo-syphilitique porteur de lambliaose cholédocienne. [**Haemolytic Jaundice with Splenomegaly in a Congenital Syphilitic with *Leishmania* in the Bile.**—*Bull. et Mém. Soc. Méd. Hôpit. de Paris.* 1927. June 9. Year 43. 3rd Ser. Vol. 51. No. 19. pp. 810-813.]

This is a critical account of a very carefully studied case of chronic haemolytic jaundice in a sickly young man of 25 years, where in the course of investigation a duodenal tube disclosed the presence of *Leishmania* in the fluid drawn off. Having determined by experiment that the *Leishmania*-infected bile had not an extraordinary haemolytic potency, the author excludes the presence of *Leishmania* from the causation of a case difficult to distinguish from Addison's disease.

A. Alcock.

ÉMILE-WEIL (P.) & GRÉGOIRE (Raymond). Indications opératoires dans les splénomégaties primitives. [**Indications for Operation in Primary Splenomegaly.**—*Presse Méd.* 1927. July 27. Vol. 35. No. 60. pp. 937-939. [2 refs.]]

The authors class large spleens as (a) proliferative, of the order of tumours and (b) inflammatory with tendency to sclerosis, due probably to infections the nature of which may or may not be known. In the case of the proliferative spleens removal is not advised. These are leukaemic, in which better results are obtained by X-ray treatment, pseudo-leukaemic in which diagnosis is often difficult, Hodgkin's disease and sarcoma. The chronic inflammatory spleens are due to tuberculosis, syphilis, malaria, kala azar and to other unknown causes. Among the latter come the recently described mycotic spleens.

The authors begin by asking how it can be justifiable to remove a focus of infection which is of necessity secondary. They point out that the pre-existing blood infection may have been of short duration and infection be localized exclusively to the spleen, and to the objection that the removal of so important an organ is "antiphysiological" they oppose the arguments that the damaged organ no longer exercises its normal functions, that its work is taken over by other haematopoietic fields, that the removal of three-quarters of the infective agents enclosed in the spleen enables the relieved organism to defend itself against the remainder, and lastly that the damaged spleen is a source of danger to the liver and blood. Moreover, in cases of splenomegaly of long standing drug treatment not infrequently fails, e.g., emetine in schistosomiasis, quinine in malaria. They draw attention to the success of SALAZAR DE SOUZA at Lisbon in the removal of spleens in infantile kala azar; nine recoveries out of 14 [see this *Bulletin*, Vol. 22, p. 691]. The operative mortality in Egyptian splenomegaly of schistosomal origin is 10-16 per cent. Of 6 cases of mycotic splenomegaly submitted to operation by the authors, 3 have recovered; 2 of these are relatively recent. They go on to indications and contra-indications for the operation and the preparation of the patient, for which the original must be consulted.

A. G. B.

NANTA (A.). L'iode dans le traitement des splénomégaties. [**Iodine in the Treatment of Splenomegaly.**].—*Presse Méd.* 1927. July 9. Vol. 35. No. 55. pp. 867-868. [2 refs.]

This author from Algiers, states, without giving details, that he has had good results from the administration of iodine in splenomegaly, whether malarial, syphilitic, or mycotic. The intravenous channel he finds the best.

A. G. B.

HITZROT (Lewis H.). **Coexisting Typhoid and Malaria. A Reconsideration, with Report of a Case.**—*Jl. Amer. Med. Assoc.* 1927. Aug. 20. Vol. 89. No. 8. pp. 596-598. [13 refs.] [Hosp., Univ. Pennsylvania.]

The conception of typhomalaria as a clinical entity is here attributed to WOODWARD, a Civil War army surgeon, in 1862, and the laying of the phantom, though it still haunts the minds of some physicians, to OSLER. The author discusses many records of the co-existence of the two diseases and among them that of H. H. SCOTT in Jamaica, who described 15 cases in which both diseases were diagnosed [see this *Bulletin*, Vol. 15, p. 252]. SCOTT was struck with the uniform mildness of the combined symptoms. The author notes that of 543 typhoid patients in a series in Philadelphia only two gave laboratory evidence of superimposed malaria. In the fresh case reported here the malaria appeared to be dominant, an unusual phenomenon. The temperature curve was that of double tertian; cultures of *B. typhosus* were obtained from urine and faeces at the same time as plasmodia from the blood. The Widal reaction, negative on admission, was 8 and 12 days later strongly positive. This, and the rapid disappearance of the bacilli on treatment, leads the author to think that the patient was not merely a typhoid carrier.

"The course of the illness described was mild while under observation, the patient remaining afebrile after moderate quinine dosage. The facts, therefore, conform with the impression gained by others who have observed the double infection, that the course is apt to be milder than that of either disease alone."

A. G. B.

SNIJERS (E. P.). Het typhoïed-vraagstuk van tropische zijde bezien. [**The Tropical Aspect of the Typhoid Question.**].—*Nederl. Tijdschr. v. Geneesk.* 1927. Supplement to No. 15. Oct. 8. pp. 436-454. With 12 graphs. [19 refs.]

Generally speaking, typhoid fever is a frequent disease in the tropics. That the disease has long been endemic in the Dutch Indies is shown by WASZKLEWICZ's report in 1865.

In the army of the Dutch Indies typhoid fever in the period 1906-1916 was one of the principal causes of death with 10-25 per cent. of the total mortality, the mortality from this disease being greater than in the European armies, including the Russian, and approximating to that of the mortality of the British Army in India in 1905-1909 (15.8-31.9) and the French Army in Algiers in 1910 (14.2).

As regards the incidence of typhoid among Asiatics SCHUFFNER found that the typhoid mortality of Javanese and Chinese workmen of the Senembah Society for the period 1897-1904 was 30 per 10,000, for the period 1905-1912 14 per 10,000, and from 1913-1921 from

0 in 1915 to 22.7 in 1914. A similar high incidence of typhoid is found in the whole of East Coast. The influence of the climate itself must not be overestimated. The general hygienic state is of greater aetiological importance than the temperature, so that the typhoid incidence may be regarded as a gauge of the hygienic condition of a given district (disposal of sewage, water supply, isolation of infectious diseases and individual hygiene).

Next to typhoid paratyphoid A is the most frequent in the tropics. Salmonella infections (paratyphoid B, C, etc.) are much less frequent, contrary to what is found in North West Europe.

Investigations in British India, which have been confirmed elsewhere, have shown that the epidemiology of paratyphoid A is identical with that of typhoid, the source of infection being always a patient or a carrier.

J. D. Rolleston.

TRESTON (M. L.). **Enterica. Some Notes on the Value of Marris's Atropine Test in Diagnosis, and of T.A.B. Vaccine in Treatment. A Résumé of 151 Cases (1919-26).**—*Indian Med. Gaz.* 1926. Oct. Vol. 61. No. 10. pp. 477-479. [5 refs.]

The author notes that in addition to the clinical symptoms of typhoid fever other means of diagnosis should be employed if the diagnosis is to be confirmed at an early date. These are :—

1. Blood culture 1st to 5th day.
2. Widal's reaction 5th to 9th day or later.
3. Marris's atropine test.

The author describes the Marris test and considers it to be of definite value [v. this *Bulletin*, Vol. 22, p. 392 (de CASTRO)]. As the result of experience he concludes that the T.A.B. vaccine in the treatment of enterica is of undoubted value. The vaccine may be given at any stage of the disease.

J. H. Tull Walsh.

DELANOE (P.). Au sujet du décès d'un jeune fonctionnaire causé par une fièvre typhoïde compliquée d'ictère franc. [**Case of Death from Enteric Fever with Jaundice.**]—*Bull. Soc. Path. Exot.* 1927. July 13. Vol. 20. No. 7. pp. 576-577. [1 ref.]

Calls attention to a second case of death in Morocco from enteric fever with jaundice and to the need for persons going to Morocco to be vaccinated against this infection.

A. G. B.

PAES (Augustine). **A Short Description of an Epidemic Disease of Children Prevalent in Goa since 1921.**—*Indian Med. Gaz.* 1927. Aug. Vol. 62. No. 8. pp. 428-430.

This epidemic, in children under six years, is one in which continuous vomiting, convulsions followed by muscular flaccidity, anaesthesia, coma, tympanites are prominent in severe cases with a 30 per cent. fatality; benign cases are also described and fulminant, in which death occurs in a few hours. It affects chiefly Christian children. In two post-mortems a Government Commission found the diplococcus

of cerebrospinal meningitis in the C.S.F., but no typical symptoms of this were seen by the author and the course was always afebrile. Anti-meningococcus serum was administered without benefit.

A. G. B.

BABLET (J.) & MESNARD (J.). Syndrome rabiforme dans un cas de typhus exanthématique chez l'Annamite. [**A Case of Typhus in an Annamite suggesting Rabies.**—*Bull. Soc. Path. Exot.* 1927. Apr. 13. Vol. 20. No. 4. pp. 318-320. [2 refs.]

A woman, aged 20, was bitten by a dog suspected of rabies on September 9th, and was admitted to hospital. The next morning she was violent and had to be controlled, temperature 38°, some difficulty in swallowing water; there was history of a bite some months before. September 11th, T. 38.5°; incessant contractions of the masseters; dysphagia less marked. September 12th and 13th, T. 39.5° to 40°; spasmodic contraction of the face muscles. September 14th, T. above 40°; spasms continued. September 15th, improvement, temperature falling completely by 20th, and the mental state becoming normal the next day. The Weil-Felix reaction was tested on the 14th, and found to be positive, 1-300, and again on the 19th. This was a sporadic case of typhus, occurring in the dry season.

Cases with similar symptoms were reported by CANTACUZENE in the Rumanian epidemic [this *Bulletin*, Vol. 17, p. 412].

A. G. B.

BANERJI (R. N.). **A Case of Typhus Fever in Allahabad.**—*Indian Med. Gaz.* 1927. Aug. Vol. 62. No. 8. p. 452.

The patient had symptoms corresponding with those of typhus, which is a rare disease at Allahabad. No serological test was applied. No ticks or lice were seen on his body. No other cases were seen or reported.

A. G. B.

ALDEN (H. S.). **Cholelithiasis and Cholecystitis in the Negro.**—*Southern Med. J.* 1927. Nov. Vol. 20. No. 11. pp. 828-829. [7 refs.] [Emory Univ. School of Med., & Emory Division of Grady Hosp., Atlanta, Ga.]

The author quotes statistics of the incidence of cholelithiasis and cholecystitis in the negro of the U.S.A. which, he says, are surprisingly scanty but show that these conditions are much less frequent than in whites. In five years in Atlanta, Georgia, among 23,016 coloured admissions to the hospital wards, 39 cases of cholelithiasis or cholecystitis were diagnosed, of which 9 were proved to be one, and 9 the other condition. This brings the percentage of gallstones to the low figure of 0.039, that of cholecystitis being given as 0.13 per cent. [the discrepancy is not explained]. In the same period there have been 696 autopsies with two cases of gallstones, or 0.3 per cent., and no record of cholelithiasis. The author discusses this racial rarity, the cause of which is obscure. He suggests that "as civilization leads the negro into physical lethargy and a sedentary life, he will become more and more a victim of gastro-intestinal diseases, and will more easily acquire cholecystitis and cholelithiasis."

A. G. B.

THEODORE (J. H.). **A Preliminary Note on the Treatment of Small-pox by Intravenous Administration of Potassium Permanganate.**—*Indian Med. Gaz.* 1927. Sept. Vol. 62. No. 9. pp. 508-510. [2 refs.] .

The author writes that of all the remedies used to prevent pitting and scar formation in smallpox potassium permanganate, locally applied, is said to be the most valuable. GORDON has shown by *in vitro* experiments that a dilution of 1 : 100,000 is sufficient to destroy vaccinia virus. With the idea that intravenous injection of the drug might abort smallpox the author carried out experiments at first on rabbits and then on man.

Rabbits were found to stand an injection of 10 cc. of a 1 : 500 dilution on three consecutive days, without ill effects, nor did the same dose disturb the author. Experiments were then made on rabbits vaccinated with calf lymph and treated 20 hours later with pot. permang. intravenously. The results tended to show that the drug had an abortive effect on vaccination. Three cases of smallpox (rash discrete) were then treated with a single dose of 1 : 500 dilution, with results sufficiently encouraging to warrant further trial. It is noted that a higher dose would probably be tolerated.

A. G. B.

ROELFSMA (H. L.). **Het zenuwlijden der blanken in de tropen. [Nerve Affections of Whites in the Tropics.]**—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1927. Vol. 67. No. 5. pp. 658-666.

The author refers to the article of VAN LOON on the same subject (see this *Bulletin*, Vol. 24, p. 824). As a rhinologist it struck him that the picture which VAN LOON gives of the tropical neurosis shows a close similarity to the reflex neurosis brought about by intranasal affections. He quotes a few instances in which a neurosis was cured by adequate intranasal treatment. Generally speaking, he thinks that tropical neurosis is nothing but an increased irritability of the reflex mechanism. Affections of various organs may give rise in this way to untoward symptoms and special emphasis is laid in this respect on the prevalence of nasal affections in the tropics. The author gives a rather simplistic explanation of the various nervous symptoms, e.g., the hyperhidrosis of the neurotic is a sequel of his stopped nose, as the dry throat causes him to drink much, etc. Some reservation as to his conception of tropical neurosis appears justified.

W. J. Bais.

BASU (P. N.). **Some Observations on Cases of Anaemia amongst Troops in Bombay.**—*Indian Jl. Med. Res.* 1927. July. Vol. 15. No. 1. pp. 107-116. [4 refs.]

This illness is mainly confined to Hindus who adopt a dietary deficient in animal protein. Almost all cases investigated gave a history of diarrhoea closely simulating sprue, while in others there was dyspepsia. The total number of cases was 16, of which 14 were in

Indians and 2 in Europeans, one of whom had symptoms of sprue. Amongst the various methods of ascertaining the cause of the anaemia were the following :—

- (a) Examination of gastric contents for free hydrochloric acid by fractional tests.
- (b) Examination of faeces for total and split fats.
- (c) The diastatic reaction of the urine.
- (d) Examination of blood for the haemolytic point, calcium content, for presence of bilirubin and estimation of lipoids.
- (e) Bacteriological examination of faeces.
- (f) Experimental administration of certain intestinal haemolytic streptococci and other non-lactose fermenting organisms.
- (g) Experimental treatment of patients by autogenous vaccine and blood forming drugs.

The results showed that in almost all cases of anaemia there is a deficiency of hydrochloric acid in the gastric juice ; that of healthy Indians is below the European standard. The estimation of neutral fat and free fatty acid in the faeces showed that whereas in 40 healthy individuals the rate was 1 : 2.9, in anaemic conditions it was as high as 1 : 8.8, which is mainly due to the action of intestinal bacteria. The excretion of total fat was not high, thus differing from sprue where fats form more than 40 per cent. of the total weight of dried faeces. As regards the blood, none of the anaemia cases showed marked regeneration types of red cells, thus showing an aplastic anaemia. The Van den Bergh test gave a positive indirect reaction with slight increase of bilirubin content in comparison with that of healthy Indians. The calcium content of 12 healthy individuals (Indians) gave an average of 7.5 mgm. per 100 cc., the average of the 16 anaemias 6.8–7 mgm. per 100 cc. Estimation of blood lipase (Lowenhardt's method) showed a deficiency of absorption fats in almost all cases.

Bacteriological examination of the stool revealed the presence of a large number of putrefactive and fermentative organisms virulent in type.

No improvement in suspected sprue was noted after administration of calcium and parathyroid extract. In three cases blood transfusion of 8 ounces of blood was carried out on two occasions. One European case improved very much, but in the other two, Indian, cases the improvement was not maintained.

P. H. Manson-Bahr.

CAMPBELL (G. J.) & PATEL (G. P.). **Some Observations on Appendicitis among Indian Women.**—*Indian Med. Gaz.* 1927. Aug. Vol. 62. No. 8. pp. 437–438.

Twenty-five appendices removed with aseptic precautions from Indian women at Delhi by the senior author were examined microscopically and bacteriologically. Fourteen showed from one to seven threadworms each. Twenty-three contained faecal matter. Cultures gave a growth of *B. coli*. All the patients had been admitted for gynaecological complaints. The authors ask : What is the cause of the reflux of faecal contents into the appendix ; is the presence of Oxyuris a result of this reflux ; what is the normal incidence in Indian women of this worm ?

[SPRIGGS records the results of examination by X-rays of 300 appendices. He concludes that the normal appendix fills and empties about

the same time as the caecum. Photographs are given of 12 normal appendices in all of which more or less of the barium is visible (*Lancet*. 1919, Jan. 18. p. 91).]

A. G. B.

GRACE (A. W.). **A Case of Uraemia.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1927. Aug. 31. Vol. 21. No. 2. pp. 151–152.

Case observed in a negro in British Guiana. It was of interest on account of the apparently localized cerebral disturbance in the fit, high blood urea and inorganic phosphate, and the occurrence of large white kidneys at autopsy—a rather uncommon finding in British Guiana.

A. G. B.

LICHTENSTEIN (A.). Over temporaire Urobilinurie. [**Transitory Urobilinuria.**]—*Geneesk. Tijdschr. v. Nederl.-Indië*. 1927. Vol. 67. No. 6. pp. 899–906. [6 refs.]

The author summarizes the conclusions from his experiments as follows:—

1. Some people show a physiological urobilinuria, depending on the taking of food and its quantity.

2. The presence of urobilin in a specimen of urine voided in the afternoon or in the evening has not necessarily a pathological significance. Such may be attached, however, to the same finding in the morning hours, generally speaking before noon.

(3) Injection of 100 cc. haemolysed own blood may produce urobilinuria.

(4) The normal liver does not always constitute an absolutely tight barrier against the passing of urobilin into the blood. (Experiments in which urobilin appeared promptly in the urine after emptying of the gall bladder by means of a pituitrin injection.) Probably, however, the absorption of urobilin from the colon through the venae haemorrhoidales plays a part in the causation of the physiological urobilinuria.

W. J. Bais.

JUNGEBLUT (Claus W.). Ueber die Beziehungen zwischen retikulo-endotheliale System und chemotherapeutischer Wirkung. [**Relations between the Reticulo-endothelial System and Chemotherapeutic Action.**]—*Ztschr. f. Hyg. u. Infektionskr.* 1927. Apr. 29. Vol. 107. No. 2. pp. 357–379. [33 refs.]

FELDT (Adolf) & SCHOTT (Alix). Die Rolle des Retikuloendothels beim chemotherapeutischen Heilungsvorgange. [**The Role of the R.E. in Chemotherapeutic Curative Processes.**]—*Ibid.* pp. 453–471. [13 refs.]

These two papers, the one from the Frankfurt and the other from the Koch Institute, are concerned with essentially similar problems and the conclusions to which the authors arrive are practically identical. Much attention has been given in recent years to the part played by the reticulo-endothelial system in immunological phenomena, particularly in the fields of natural immunity and antibody-response to antigen. By blockading the reticulo-endothelial system (repeated parenteral injection of substances like indian ink and various dyes) and by removal of spleen or preferably by both of these procedures, it has been possible to reveal differences in response to antigen injection, degree of immunity, etc. The particular problem studied by Jungeblut

and Feldt and Schott was the influence of chemotherapeutic substances on spirochaete and trypanosome infections in animals previously prepared by blockade or splenectomy or both. It was thought that light might be thrown on the modification presumed to take place in chemotherapeutic substances after injection into the body, which would explain their comparative lack of action *in vitro*. The experimental infections were brought about in mice with *S. recurrentis* and *T. brucei* and the substances tested were neosilbersalvarsan and "Bayer 205." The paper contains numerous tables of experimental results. The conclusion is reached that (1) *recurrens* infection in blockaded mice runs a far severer course than in normal mice, (2) that doses of neosilbersalvarsan which in 100 per cent. of cases would sterilize the controls are by no means sufficient in blockaded and splenectomized animals, and (3) that the full action of chemotherapeutic substances in these protozoan infections of mice appears to depend on the intactness of the reticulo-endothelial system, the suggestion being that the change in these substances from the inactive form *in vitro* to the active *in vivo* takes place through the intermediary of the reticulo-endothelial system.

Feldt and Schott's communication is equally well documented. *Recurrens* and nagana infections in mice were also the test infections, and various chemotherapeutic substances were employed, such as salvarsan, solganal, trypaflavin, "Bayer 205," etc. They conclude that the reticulo-endothelial system has other functions than those of antibody-production and phagocytosis and that on its intactness depends the therapeutic action of the chemical substances in question.

These two papers contain valuable summaries of relevant literature.

J. C. G. Ledingham.

KRITSCHIEWSKI (I. L.) & RUBINSTEIN (P. L.). Ueber die Natur der Immunität beim Rückfallfieber. I. Der Einfluss des retikulo-endothelialen Apparates auf den Verlauf des Rückfallfiebers. [**Immunity in R.F. Influence of the R.E. System on the Course of R.F.**].—*Ztschr. f. Immunitätsf. u. Experim. Therap.* 1927. May 18. Vol. 51. No. 1-2. pp. 27-56. With 3 diagrams in text. [Refs. in footnotes.]

LISGUNOVA (A. W.) & BUTJAGINA (A. P.). Ueber die Natur der Immunität beim Rückfallfieber. II. Das retikulo-endotheliale System der Ratten beim Rückfallfieber.—*Ibid.* pp. 56-64. With 1 diagram in text. [4 refs.]

These two papers from the Moscow Microbiological Institute contain the results of further experimental work by Kritschewski, the Director, and various collaborators in connexion with the R.-E. system. The chief object was to ascertain what part the spleen played in *recurrens* infection—a problem often studied in the past but hitherto not fully elucidated. The results obtained from mice experimentally infected at various periods after splenectomy, blockade or both procedures, seem remarkably uniform, and appear to show conclusively that removal of the spleen influences very markedly the mortality from *recurrens* subsequently injected. The percentage of animals which succumb to infection with spirochaetes induced 24 hours after splenectomy was 74.08, 48 hours after splenectomy, 88.89, three days after,

86.45, four days after, 59.26, and seven days after, 15.0. Mice infected after simple laparotomy gave a mortality of 4.25, while mice not operated upon gave a mortality of only 3.82 per cent.

It is thus seen that compensatory mechanisms for loss of spleen substance are soon set in motion. Simple blockade of the R.-E. system was accompanied by a mortality to subsequent infection of only 46.15 per cent. whereas combined splenectomy and blockade had a mortality to subsequent infection of 90.47 per cent. It is clear, therefore, that in chemotherapeutic experiments on blockaded or splenectomized animals, account has to be taken of the very different course of the infection produced by such interferences alone. The maximal effect of a chemotherapeutic substance would depend on some balance between two factors, the nature and dose of the substance and the resistance of the body to the particular infection employed—a resistance which would be determined by the condition of the R.-E. system generally and the spleen in particular. The results in the authors' view are in complete accord with those of METCHNIKOFF on the importance of the spleen in recurrent fever immunology.

J. C. G. Ledingham.

KRITSCHESKI (J. L.). Das retikulo-endotheliale System und Chemotherapie. [**The Reticulo-endothelial System and Chemotherapy.**] —*Cent. f. Bakt. I. Abt. Orig.* 1927. Vol. 104. No. 1-4. pp. 214-218. [10 refs.]

In previous abstracts of the work of this author and his collaborators reference has been made to the importance of the integrity of the reticulo-endothelial system for the effective action of chemotherapeutic substances. In the case of relapsing fever a solution of the problem of the mechanism involved is complicated by the fact that the natural defence against experimental infection with the spirochaete is believed to reside in the R.-E. system. The present paper, which was delivered at a meeting of the *Deutsche Vereinigung für Mikrobiologie* at Vienna in June, 1927, deals with experimental trypanosome infection where the R.-E. system does not apparently constitute a natural defence system. Here Kritschewski recognized the necessity of studying the mechanism of the chemotherapeutic effect when the drug was administered "prophylactically," i.e., at a time when the parasites have not yet appeared in the blood and by their dissolution stimulated the antibody-forming tissues, thus complicating the evaluation of the drug effect. A series of representative derivatives was used, trypanred, pyronin, trypanosan, atoxyl, neosalvarsan, tartrate of antimony, trypanflavin and germanin. The results of the experiments, protocols of which are to be published elsewhere (in *Zeitschr. f. Immunitätsf.*) showed that splenectomy greatly diminished the efficiency of all these substances without exception. Germanin, for example, not only loses its sterilizing action, but in 40 per cent. of trials may be rendered as inactive as distilled water. He argued, therefore, that the action of the R.-E. system as a defence mechanism cannot be correlated with its capacity to determine the efficiency of a chemotherapeutic remedy. The author now attempts to get nearer to the actual mechanism. He believes that splenectomy and blockade prevent the incorporation and possible elaboration of the drug by the R.-E. cells—an essential preliminary, he conceives, to the drug's therapeutic action. If not incorporated and elaborated by the R.-E.

cells, it is liable to be excreted rapidly from the body. Thus, in his view, a tropism of the drug for the cells of the body does not exclude, as EHRLICH thought, a tropism for the parasite. The former is, in fact, necessary for the due performance of the latter.

In the discussion which followed the paper, caution was advised in interpreting the results of splenectomy and blockade experiments. KOLLE adhered to the view of EHRLICH that organotropism is merely a measure of toxicity of drug and is not indispensable for its parasitotropism.

J. C. G. Ledingham.

KRITSCHESKI (I.). Ueber eine bisher noch unbekannte Funktion des retikulo-endothelialen Systems. I. Die Beziehungen der Chemotherapie und Chemoprophylaxe zum retikulo-endothelialen Apparat. [**A Hitherto Undescribed Function of the Reticulo-Endothelial System. I. Its Relation to Chemotherapy and Chemoprophylaxis.**]—*Ztschr. f. Immunitätsf. u. Experim. Therap.* 1927. Dec. 5. Vol. 53. No. 5-6. pp. 506-531. [8 refs.] [Education Commissariat R.S.F.S.R., Moscow.]

This paper contains the full protocols on which the author based the conclusions formulated in the previous paper. There are twenty tables displaying the results with a variety of drugs in experimental trypanosome infection and their careful study is recommended to all interested in the role of the reticulo-endothelial system in determining the efficacy of a chemotherapeutic substance.

J. C. G. Ledingham.

- i. SCHWETZ (J.). Introduction à l'étude des médicaments indigènes (plantes médicinales) du Congo Belge. [**Introduction to the Study of Native Medicines (Plants) of Belgian Congo.**]—*Ann. Soc. Belge de Méd. Trop.* 1927. Nov. Vol. 7. No. 2. pp. 185-198.
- ii. WATTIEZ (N.). Introduction à l'étude chimique des médicaments coloniaux d'origine végétale.—*Ibid.* pp. 199-209.

i. After preliminary remarks which illustrate the difficulties of the study the author gives a list of 48 substances, chiefly the root bark of trees collected in the Katanga district, with the native name, a very short description of the plant and its native uses. In only two instances has the botanical determination been made. [In a third the plant is said to be *Berberis vulgaris*, but this is not indigenous to Africa.]

ii. The Professor of "Pharmacognosy" of Brussels University, to whom Dr. Schwetz's specimens were sent, remarks that for the chemical study of vegetable drugs one must have the material either fresh or stabilized in some way. In the process of desiccation, especially when it is conducted without great care, the chemical composition changes. As a result of fermentation after gathering certain active principles, especially glucosides, tannins and even alkaloids may disappear entirely or at least be profoundly altered. The chemical composition must therefore be fixed by heat, either of boiling alcohol or water. The author describes a piece of apparatus which has been employed in his laboratory for some years for the chemical study of fresh plants. It is of copper with a capacity of 6 litres, carries a cylinder on its lid through which material is introduced, and is connected with a cooling apparatus to condense the vapour. Five litres of alcohol and 50 grams of calcium carbonate are introduced, the

latter to neutralize the acidity of the drugs and to reduce hydrolysis or oxidation to a minimum. When the alcohol is boiling the material is added. The chemical principles pass into the fluid, which is afterwards analysed. The author notes that the natives are well aware that a plant deteriorates in value in drying. Cola nut, for instance, must be eaten in the fresh state if it is to exercise its well-known effect. If it is impracticable to use alcohol water will do, calcium carbonate being added as before, 50 gm. to one kgm. of plant, and the boiling being prolonged for a quarter of an hour. The resulting fluid is concentrated to a small volume and introduced into the receptacle to be used for its transport with sufficient toluol to prevent bacterial action.

If no means of sterilization can be employed, the plant must be washed immediately after collection to free it of earthy particles, dried rapidly in the shade or in a well ventilated building, and placed in an airtight receptacle containing a dehydrating substance such as calcium chloride. Dr. Schwetz's specimens seem to have been dried without these precautions. Professor Wattiez adds notes on 16 of the specimens, mentioning which of them seem worth further study and indicating the presence of alkaloids where they were found, since alkaloids resist fermentation better than other active principles. Histological study may sometimes give indication of the botanical origin. Stas's method was used for research of alkaloids.

A. G. B.

HALL (Ivan C.) & WHITEHEAD (Richard W.). **A Pharmaco-Bacteriologic Study of African Poisoned Arrows.**—*Jl. Infect. Dis.* 1927. July. Vol. 41. No. 1. pp. 51-69. With 2 text figs. [31 refs.] [Univ. of Colorado Med. School, Denver.]

The following extract from the author's summary gives an adequate account of this paper:—

"Attention is again called to the general recognition that wounds by arrows, poisoned or otherwise, are likely to be infected wounds."

"The present study deals with six African bushman arrows obtained by Dr. C. E. Cadle during the Denver African Expedition of 1925 from the Kalahari, Ovachimba and Heikum tribes. The probably complex nature of the poison is suggested. Only the Heikum arrows had poison upon them. There was no evidence of alkaloidal poisons. The poison was separated into amorphous and crystalline fractions, the former about one-half as toxic as the latter. The crystalline fraction was fatally toxic for frogs in doses of 0.00039 to 0.00044 mg. per gram weight of frog. Both fractions behaved alike, killing guinea-pigs, cats and frogs by stopping the heart in marked ventricular systole. The poisons could not be identified with any known drugs but resembled the glucoside ouabain in some respects. Two kinds of crystals were noted but the small amount available precluded separation.

"All of the arrows, except the smaller Heikum arrow, had pathogenic bacilli upon their points in addition to the non-pathogenic "hay bacilli"; the obligate anaerobes (*B. centrosporogenes*, *B. bifermentans*, *B. sporogenes*, *B. nonfermentans* n. sp., *B. subterminalis* n. sp.) and the aerobes (*Staphylococcus albus*, *Streptococcus fecalis*, and *Streptococcus mitis*) occurred as indicated. The pathogens were *B. histolyticus*, *B. Novyi*, *B. septicus*, and *B. Welchii*. All of the infected arrows had *B. histolyticus* on them."

The authors note with surprise that neither *B. tetani* nor *B. botulinus* were found seeing the well-known frequency of these forms in the soil.

A. G. B.

CAIUS (J. F.) & MHASKAR (K. S.). **A Study of Indian Medicinal Plants. *Holarrhena antidysenterica*, Wall.—Indian Med. Res. Memoirs (Supplementary Series to Indian Jl. Med. Res.). 1927. May. Memoir No. 6. 61 pp. With 7 plates, 1 map, 2 figs. & 18 graphs. [39 refs.] [Haffkine Inst., Bombay.]**

This complete and detailed study was undertaken because the use of this plant as a native medicine for diarrhoea is well established; both seeds and bark figure in a large number of prescriptions used by native doctors; indeed, some pages of the memoir are occupied by these prescriptions. The authors write that they are not quack remedies, but "true prescriptions formulated according to definite rules," so that an enquiry into the therapeutic value of the plant is well justified.

The plant, which is known as Conessi bark tree and, in Bengali, as Kurchi, is a shrub or small deciduous tree of N.O. *Apocynaceae*; its botanical characters are fully described; a key to those which distinguish it from three other plants is given. *H. antidysenterica* is widely distributed in India and Burma. Its seeds, the oil therefrom, the bark, the gum, are taken up in turn. The seeds were found to contain 29.3 per cent. of fixed oil, and 0.025 per cent. of alkaloid. Of 49 cases of amoebic dysentery treated 28 improved, of 50 cases of non-amoebic dysentery 16 improved and of 28 suffering from diarrhoea of different types 17 improved. The study of the oil and its clinical trial led to the conclusion that it had no marked advantage over the powdered seeds.

The bark constitutes the principal medicine for dysentery in the Indian Pharmacopeia. The powdered bark was here dispensed in daily doses of 60 grains in three or four portions. Of 67 cases of amoebic dysentery so treated, 51 improved; of 55 cases of non-amoebic dysentery 37 improved and of 20 diarrhoea cases, 9 improved; i.e., in dysentery satisfactory results were obtained in 67 to 76 per cent. of cases. Chemical study of the bark showed the presence 9.5 per cent. gum and 0.22 per cent. alkaloid. The gum was studied and its clinical test in a smaller number of cases gave similar result to those of the bark.

A study of the alkaloid follows; it was first isolated as nereine in 1858 and was called conessine in 1865. Colour reactions and micro-chemical tests are recorded. In toxic doses conessine paralyses the respiratory centre, weakens the heart and acts as a true vaso-constrictor. Two amoebic cases that were treated improved [which hardly seem to justify the summary statement—conessine appears to be effective in the treatment of amoebic dysentery]. The authors note that the ordinary methods of plant analysis have failed to detect the principle or principles responsible for the antidysenteric properties of *Holarrhena antidysenterica*; it is neither anthelmintic, nor stimulant, nor astringent, nor styptic.

They give at the end of the memoir a table illustrating the anti-dysenteric and antidiarrhoeal efficacy of the various parts of the plant used. The time taken to return to normal conditions of health averaged 12 days in the case of the seeds and 9 in that of the bark or gum. They recommend as a safe and reliable treatment of diarrhoea the daily administration of 60–120 grains of powdered bark in 3–4 portions. A useful list of references concludes the memoir.

A. G. B.

CHOPRA (R. N.), GUPTA (J. C.), DAVID (J. C.) & GHOSH (S.). **Observations on the Pharmacological Action of Conessine, the Alkaloid of *Holarrhena Anti-Dysenterica*.**—*Indian Med. Gaz.* 1927. Mar. Vol. 62. No. 3. pp. 132-140. With 5 graphs. [7 refs.]

Holarrhena antidysenterica is a small deciduous tree of the N.O. *Apocynaceae*. It is a native of the tropical Himalayas going up to 3,500 feet, and is found through the dry forests of India as far south as Travancore; it is often confused with *Wrightia tinctoria*. The root-bark has been tried "somewhat extensively" in the treatment of amoebic dysentery. Conessine was isolated as long ago as 1858. Recently H. C. BROWN and HENRY and BROWN have studied its action [this *Bulletin*, Vol. 19, p. 690; Vol. 20, p. 782]. The conclusions of the careful investigations of the authors are as follows:—

"1. Conessine has a specific action on *E. histolytica* obtained from the stools of infected kittens. It kills these organisms in mucus flakes in dilutions of 1 in 280,000 in 8 minutes in the presence of an alkali and in 18 minutes in the absence of alkali. Emetine under similar conditions kills *E. histolytica* in dilutions of 1 in 200,000, but in the absence of alkali such dilutions have no effect on this entozoon. In view of these findings it is concluded that this alkaloid may prove to be of great use in the treatment of amoebic dysentery.

"2. In the case of intestinal protozoal flagellates such as *Trichomonas hominis*, conessine had little toxic effect, though on free-living flagellates such as *Bodo*, its effect was as marked as on *E. histolytica*.

"3. Conessine salts (hydrochloride, hydrobromide and tartrate) can be given subcutaneously and intramuscularly. One to six per cent. solutions of such salts produce only slight local effects. No necrosis of tissues was observed.

"4. The alkaloid has an inhibiting action on the activity of the digestive ferments, such as ptyalin, pepsin, and trypsin.

"5. Conessine salts when given intravenously possess a marked depressing action on the tissue of the auriculoventricular bundle and in large doses produce irregularity, incoordination, increase of diastolic pause and heart block. Even small doses given in this manner to cats produced a marked and persistent fall of blood pressure after a preliminary transient rise. These effects were not noticed when the drug was given intramuscularly or subcutaneously, and experiments show that in dilutions of 1 in 120,000 such as would be expected to occur in the blood, it has no effect on the isolated mammalian heart. The drug could therefore be administered by these routes for therapeutic purposes, but its intravenous administration is not recommended.

"6. The alkaloid has no marked effect on the central nervous system of mammals."

A. G. B.

WINTON (F. R.). **The Rat-Poisoning Substance in Red Squills.**—*Jl. Pharm. & Experim. Therap.* 1927. June. Vol. 31. No. 2. pp. 123-136. With 1 fig. [4 refs.] [Dept. Pharmacol., Univ. Coll., London.]

The author has shown that the substances in squill extracts responsible respectively for their actions on the heart and for poisoning rats are different. The latter occurs in appreciable quantity in red squill (*Urginea maritima*) but not in white squill. Red squill preparations administered per os to rats induce convulsions and paralysis. There is no diarrhoea and "an action on the circulation adds no

significant contribution to the fatal result." Female rats succumb to doses of red squills only half as great as those needed to kill males, a circumstance which favours the use of this poison in the destruction of these pests. Abnormal previous diets and administration of previous sublethal doses have little influence on susceptibility. The average lethal dose of a red squill powder may be 50 per cent larger if it is less finely subdivided. The rat-poisoning substance is relatively thermostable, is soluble in water and in concentrations of alcohol and acetone up to 90 per cent., and is destroyed by boiling with dilute acid or alkali. It can be kept for long periods without deterioration; e.g., a sample of squill powder used for 5 years as a museum specimen was still fully active.

A. G. B.

WATT (J. M.) & BRANDWIJK (Marie G.). **Poisoning by *Jatropha curcas*, L. (Physic Nut Tree or Purging Nut Tree).**—*Jl. Med. Assoc. S. Africa*. 1927. July 23. Vol. 1. No. 14. p. 370. [9 refs.]

An account from a Pharmacological Laboratory of the plant, its habit and habitat, its uses, and the symptoms of poisoning. A South American shrub, it is naturalized in Africa and South East Asia. The oil, expressed from the seeds, has an action similar to croton oil. It contains two irritant substances, an acid of the crotonoleic type and a toxalbumin, curcin. Since symptoms are slow in developing, the best treatment, whether or no symptoms have appeared, is to wash out the stomach.

A. G. B.

CHOPRA (R. N.). **An Experimental Investigation into the Action of Organic Compounds of Antimony.**—*Indian Jl. Med. Res.* 1927. July. Vol. 15. No. 1. pp. 41-48. With 6 graphs. [6 refs.] [Calcutta School of Trop. Med. & Hyg.].

This paper gives an account of the results obtained in a series of experiments designed to ascertain the mode of action of some of the derivatives of *p*-aminophenylstibinic acid now being used in India for the treatment of kala azar. Cats, weighing 2 to 2.5 kgm. were used, with urethane intramuscularly as an anaesthetic, supplemented by ether when necessary. The drugs were injected into the femoral vein in doses of 10 to 100 mgm. in 4 per cent. solution. Doses of 50 mgm. gave marked reactions, while with 100 mgm. the symptoms amounted to toxic effect.

The drugs all produced a fall in systemic blood pressure, due probably to lessened output of the left ventricle and to dilatation of vessels in the splanchnic area; there is a corresponding rise in pulmonary pressure. It is to these effects, and those on the respiration referred to below, that the more severe toxic symptoms, which occasionally follow injections of antimonial drugs, are attributed. These symptoms resemble the "nitritoid crises" resulting from the injection of organic arsenical drugs and for which four causative factors have been suggested, (a) effect of the drug on the pulmonary arterioles causing contraction, (b) excessive alkalinity of the solution causing irritation of the endocardium, (c) constriction of the bronchi, (d) pulmonary vascular constriction due to precipitation of the drug; (a) and (c) are regarded as operative also in the case of antimony compounds and

(d) is under investigation, but as regards (b), the antimony solutions are acid (pH 4 to 7) and the effect is least marked in the most acid, tartar emetic, so that the acidity (or alkalinity) factor is believed to be of little moment.

The limb volume shows a slight fall and the intestinal volume a slight fall, followed by a slight rise. Peristaltic movement increases and becomes irregular. There is a well-marked decrease in the volume of the kidney and rhythmic contractions become more apparent.

Even a dose of 50 mgm., which produces little effect on the blood pressure, causes a well-marked dilatation of the spleen and the liver. These effects, which are shown less by tartar-emetic, are believed to be of importance in connexion with the superior curative value of the organic antimonials, since they are thought to be due to the engorgement of these organs with blood carrying the drug.

Little or no effect is produced on respiration except when large doses are given. The respiration stops immediately the blood pressure falls and afterwards is jerky and irregular and the breathing changes from abdominal to intercostal and finally thoracic. These changes are attributed to (1) depression of the respiratory centre, (2) rise in pulmonary pressure, and (3) contraction of the bronchial muscles.

T. A. Henry.

HODGSON (E. C.), VARDON (A. C.) & SINGH (Zorawar). **Studies of the Effects of Antimony Salts. No. 1. The Effect of Antimony Salts on Conception and Pregnancy in Animals.**—*Indian Jl. Med. Res.* 1927. Oct. Vol. 15. No. 2. pp. 491–495.

The authors state that over 60,000 patients were treated for kala azar with antimony salts in 1925–6 in Assam, and over 100,000 in Bengal, and that there is an impression among patients and their friends that these salts cause sterility or abortion. They therefore experimented on rabbits and white mice with sodium antimony tartrate, which is chiefly used in India because it is cheap, and two unnamed organic salts, one of which is non-irritant when injected under the skin. The mice were used in batches of 10 females and 2 males, and the results for each species are tabulated with details of the number of young born. Adequate controls were employed. The authors recognize that the number of experiments was small and the time, 3 months, short, but they reach the conclusions that salts of antimony cause damage to female animals while receiving periodic injections, the damage showing itself in either failure of conception, abortion or damage to the foetus, that the injury appears to pass off rapidly when injections are discontinued, and that evidence is wanting of any effect in causing sterility in males. Clearly, further investigation is called for.

A. G. B.

Roy (Nagendra Nath). **Conjunctival Congestion after Urea-Stibamine Injection.**—*Indian Med. Gaz.* 1928. Jan. Vol. 63. No. 1. pp. 17–18.

The author notes that in a patient receiving twice a week injections of urea-stibamine, 0.05 gm. to 0.20 gm., five minutes after each injection the conjunctivae became "extremely red and congested" for about two hours, the congestion being accompanied by fits of sneezing.

A. G. B.

LA TERZA. Alguns casos de accidentes com o treparsol. [**Toxic Effects of Treparsol.**].—*Brazil-Medico*. 1928. Dec. 11. Year 40. Vol. 2. No. 24. pp. 329-333. [3 refs.]

Four cases of much interest are here recorded, showing the risks of taking treparsol except under prescription and observation.

The first was a woman of 24 years who appears to have been very susceptible to the action of the drug. She took two pastilles of treparsol for eczema of the hands. The following day she was pallid, with a pulse-rate of 110, temperature 36.2° C., icteric discoloration of the sclerotics, epigastric pain and slight palpitation. Recovery was rapid after administration of adrenalin and cardiac tonics.

The second was a boy, 10 years of age; he was given two pastilles of treparsol on each of the first three days of August; on the 18th to the 21st one each morning and evening. After a further interval of ten days he took two daily for 23 days. Thirty-six hours later he complained of headache and giddiness; convulsions of an epileptiform character supervened with persistent coma; the urine contained albumin and hyaline and granular casts. Cerebrospinal fluid was withdrawn and revealed abundant albumin, and gave a positive Wassermann reaction. Death occurred the same day.

The third case was a man of 21 years, who, after 24 injections of thiosol, was given two tablets of treparsol daily for three days, to be repeated after an interval of three more days. At the beginning of the second series he complained of headache and pain in the stomach, but nevertheless took the second dose of two tablets. The symptoms became aggravated and there was bilious vomiting, mental hebetude, slight trismus and some indications of meningitis, rigidity of the neck and Kernig's sign. The cerebrospinal fluid was clear, but highly albuminous. Death took place seven hours later.

The fourth was a dentist, aged 28 years, suffering from a chronic pharyngitis. Treatment by 914 was suggested but refused, and treparsol was substituted. He took three pastilles on each of three successive days, though he experienced chilly sensations after the second day. In the afternoon of the third day he was attacked with vertigo, bilious vomiting and diarrhoea, succeeded by weakness of the legs and pain in the calves. He improved sufficiently to return to work in a month. Some three weeks later he began to suffer from dyspepsia and jaundice, which became worse and was accompanied by bilious vomiting, sometimes with blood. The gums bled readily, the faeces were grey in colour, and the urine bile-stained. Under treatment he slowly recovered, but not for fully three months from the onset.

The author ascribes the condition to a state of "colloidoclastic shock," a kind of anaphylaxis due to idiosyncrasy to the arsenical group of drugs.

H. Harold Scott.

BENDER (William L.). **Stovarsol (Spirocid) Poisoning. Report of Six Cases.**—*Amer. Jl. Med. Sci.* 1927. Dec. Vol. 174. No. 6. pp. 819-833. [23 refs.] [Univ. of California Med. School, San Francisco, Calif.]

This drug was synthesized by EHRLICH in 1909, tested therapeutically and discarded on account of its toxic properties and weak effect in syphilis; it was re-examined in 1921 by TREFOUEL, who believed its failure to be due to impurities: in 1922 it was introduced by LEVADITI for the treatment of syphilis. It contains 27 per cent. arsenic. It is used in amoebiasis and yaws as well as other infections. The author describes all the undesirable effects which he has been able to find in

published papers and reports fully 6 cases of his own. In these the findings were, *Endameba councilmania* (3 cases), *Giardia*, *E. histolytica*, supposed amoebiasis (1 case each).

Conclusions.—"Stovarsol (spirocid) . . . produces undesirable symptoms with considerable frequency; although a variety of manifestations have been reported, there are certain outstanding signs such as fever, skin eruption and adenitis which appear quite constantly as a syndrome characteristic of stovarsol poisoning. Though reactions are usually mild, some exceptionally severe ones have been reported, including exfoliative dermatitis and one fatality.

"While individual idiosyncrasy is the most important cause of ill effect from the drug, the consideration of lesser factors such as selection of cases for its use and the dosage is important. The acquaintance with and recognition of the early toxic symptoms is essential in prescribing stovarsol since in most instances prompt discontinuation is all that is necessary to avoid serious poisoning."

A. G. B.

CHOPRA (R. N.) & DAVID (J. C.). **The Pharmacological Action of Quinamine.**—*Indian Jl. Med. Res.* 1927. Oct. Vol. 15. No. 2. pp. 343-348. With 3 graphs. [5 refs.] [School Trop. Med., Calcutta.]

Quinamine is an alkaloid found in small quantities in the bark of several species of *Cinchona* produced in India. Its action has not hitherto been investigated. It was lethal to *Paramecium caudatum* at pH 7.8 in 30 minutes in 1:6,000 dilution, and in this respect is less toxic than the other alkaloids of cinchona bark except cinchonine. It has such a pronounced effect on the uterus of cat and guinea pig that the authors are disposed to make it responsible for the oxytocic property attributed to quinine.

A. G. B.

HUGHES (T. A.) & SHRIVASTAVA (D. L.). **Effect of Quinine on Phosphorus Metabolism in Man.**—*Indian Jl. Med. Res.* 1927. Jan. Vol. 14. No. 3. pp. 601-617. [29 refs.]

Quinine in anti-malarial doses in man causes a retention of phosphates. In the light of researches by themselves and others, the authors consider it evident that the drug interferes with carbohydrate metabolism. In the doses mentioned it causes a fall in the blood-sugar, probably owing to an increased output of insulin. Stimulation of the vagus nerve in cats, and injection of vagal stimulants in rabbits produces hypoglycaemia. This indicates that quinine stimulates the parasympathetic system. While the fall in blood-sugar after quinine administration can be prevented by the previous ingestion of carbohydrates, this does not prevent, but rather tends to augment the effect on the islets. When, therefore, quinine is given for long periods in large doses in the treatment of malaria, the prolonged stimulation of the pancreatic islets produces exhaustion of this tissue finally and thus the authors think it may play a rôle in the causation of a diabetic condition.

W. D. Halliburton.

GRAY (George M.). **Notes on Three Cases of Idiosyncrasy to Quinine.**
—*West African Med. Jl.* Lagos. 1927. Oct. Vol. 1. No. 2.
pp. 28-29.

In the three cases described a dose of 4 or 5 grains of bisulphate or hydrochloride of quinine was followed by an erythematous rash all over the body, restlessness and oppression, increased pulse rate, dilated pupils (in 2 cases). In two of the patients the symptoms were so severe that the patients, who had just come to Nigeria, returned to Europe. Two attempts made to accustom one patient to quinine by beginning with small doses failed. "On the voyage [home] he went down with an attack of malaria. He was given quinine, the dose is unknown, died, and was buried at sea." [Quinine had been forced upon this patient in Nigeria with the result that he became so ill that his life was despaired of, so that the implication in the statement quoted seems justified.]

A. G. B.

PÓVOA (Hélión). Syndrome quinino-anaphylactica. (Caso clinico.)
[**Quinine Anaphylaxis.**]—*Brasil-Médico*. 1927. Feb. 19. Vol. 41.
No. 8. pp. 155-157.

Instances of cutaneous rashes occurring during quinine administration and usually denominated susceptibility to the drug are ascribed to anaphylaxis. Mention is made of a man of 32 years who suffered from giant-urticaria while taking gramme doses of hydrochloride of quinine for an attack of influenza. Instead of suspending the use of the drug, the author treated the case by "desensitization," reducing the dose daily by 5 cgm. for ten successive days. Attacked afresh by influenza, the patient was given the full gramme dose, without ill effect.

H. Harold Scott.

HOFFMANN (W. H.). Sobre la farmacología del aceite de chaulmoogra.
[**The Pharmacology of Chaulmoogra Oil.**]—*Sciencia Med.* 1927.
July Vol. 5. No. 7. pp. 357-358. [Finlay Lab., Havana.]

The various preparations of chaulmoogra oil vary greatly in their efficacy. To which constituent the benefit is due is uncertain. It is suggested that the components and the relative proportions of these should be stated on the preparations in order that the question as to whether the relative efficacy accords with the degree of optical activity might be tested by practitioners..

H. Harold Scott.

WOLFF (J. W.). De gevaren der tetrachloorkoolstof. [**The Dangers of Carbon Tetrachloride.**]—*Geneesk. Tijdschr. v. Nederl.-Indië*. 1927. Vol. 67. No. 2. pp. 254-276. With 13 figs. on 4 plates. [43 refs.]

Some controversy still exists in the current literature concerning the character of the toxicity of carbon tetrachloride. Whilst some authors ascribe this toxicity to very poisonous admixtures (KHALIL, see this *Bulletin*, Vol. 23, p. 779) others suspect the drug as such. Some

brands apparently produced no toxic effects notwithstanding the presence of much impurity; in other cases fatal intoxications occurred by carbon tetrachloride responding to all tests of purity.

Wolff quotes three new cases of fatal carbon tetrachloride intoxication, all running the usual course and showing the usual anatomopathological picture. The literature concerning the toxicological research on the drug is reviewed and the author describes a series of experiments in rabbits in which, after doses of 0.05–2 cc. per kg. weight, he was able to show invariably a more or less serious injury to the liver (fatty degeneration to central necrosis). In these experiments the same effect was produced by the separate fractions obtained by fractional distillation of a brand of carbon tetrachloride which had given rise to clinical intoxication. In cases in which the animals were kept alive long enough signs of repair in the affected parts of the hepatic acini were clearly demonstrated.

As a test for possible temporary injury of the liver by the drug in human subjects the author employed the estimation of the fibrin content of the blood (WOHLGEMUTH'S method). Extensive injury of the liver causes, or is anyhow without exception associated with, low fibrin values (FOSTER and WHIPPLE). In 3 rabbits as well as in 17 patients a temporary lowering of the fibrin value of the blood was shown after administration of moderate doses of carbon tetrachloride (3 cc. in the patients). It is never to be foretold whether such a temporary injury of the liver will yield to repair or not. The use of carbon tetrachloride under any circumstances is disapproved.

W. J. Bais.

MINOT (A. S.). **The Relation of Calcium to the Toxicity of Carbon Tetrachloride in Dogs.**—*Proc. Soc. Experim. Biol. & Med.* 1927. Mar. Vol. 24. No. 6. pp. 617–620. [12 refs.] [Vanderbilt Univ. Med. School, Nashville, Tenn.]

Whereas LAMSON and his associates were able to give as much carbon tetrachloride to dogs as 250 cc. without visible signs of intoxication [this *Bulletin*, Vol. 21, p. 411] the author lost most of his animals after 4 cc. They showed muscle twitching increasing in severity till almost all the muscles were involved in tetany. In LAMSON'S experiments the diet was well balanced; in Minot's it was almost exclusively lean meat scraps containing very little bone, resulting in a radical decrease in the calcium intake. The dogs were found to have a high degree of bilirubinaemia and it is well known that bile salts combine with calcium in the blood, leaving a decreased concentration of ionized calcium. It was then found that the tetany could be prevented by intravenous administration of calcium chloride, and further that when calcium salts were added to the meat diet the dogs had the same tolerance for carbon tetrachloride as in LAMSON'S experiments. He notes that "the possibility that the production of serious symptoms by the lack of dietary calcium might occur as readily in any other jaundiced condition, may be a point of considerable clinical importance," and suggests that children should receive an adequate calcium diet preceding CCl_4 administration, and that calcium therapy should be tried in poisoning by this drug.

A. G. B.

MACHADO (Antenor). Essencia de chenopodio. [**The Constitution of Chenopodium.**].—*Brasil Medico*. 1927. May 21. Vol. 41. No. 21. pp. 498-500.

Chenopodium ambrosioides, the species found in Sant Maria, contains 40-42 per cent. of ascaridol. When heated to 110° C., this is transformed to an isomeric anhydride of ascaridol, gljol, which is present in the plant in a proportion of 5 per cent. It is thick, viscid liquid, boiling between 138° and 140° under a pressure of 15 mm. Hg. The ascaridol possesses marked anthelmintic properties, especially acting on *Ascaris* and *Ancylostoma*, but feebly on *Nector*, and not at all on *Oxyuris* or *Trichocephalus*. The ascaridol gcol is a very weak anthelmintic.

A synthetic ascaridol is prepared which is reported to give surprisingly good results in doses of 4 drops for each year of age in children, and 70 drops for adults.

H. Harold Scott.

GRAF (Hans) & MÜLLER (I.). Kymographische Untersuchungen ueber die Adsorption aktiver Substanzen des Chenopodiumöls an Kohle. [**Researches on the Adsorption by Carbon of the Active Principles of Oil of Chenopodium.**].—*Arch. f. Wiss. u. Fakt. Tierheilk.* 1927. Jan. 16. Vol. 55. No. 4. pp. 349-360 With 8 text figs. [17 refs.]

It may be shown kymographically that oil of chenopodium and its constituents, ascaridol and paracymol, are adsorbed by medicinal charcoal (Merck), the first in a proportion of one part of the oil to 2 of carbon, the others respectively 1:1.5 and 1:35. Attempts to separate these mixtures by allowing to stand, by shaking, or by heat, were ineffectual. Further, adsorption in these proportions deprived the oil and its components of any activity. Should the anthelmintic effects and those harmful to the host be due to these adsorbable substances (a matter for future clinical study) then the above facts point to the benefit derivable from the use of charcoal in the treatment of toxic symptoms should they arise in course of treatment.

H. Harold Scott.

MEIHUIZEN (F. H.). Een geval van Oleum-Chenopodii-vergiftiging met doodelijken afloop. [**A Case of Fatal Poisoning with Chenopodium Oil.**].—*Geneesk. Tijdschr. v. Nederl.-Indië*. 1927. Vol. 67. No. 2. pp. 312-313.

After self-administration of 10 cc. chenopodium oil, followed by Epsom salt, a European man, suffering from tapeworm (*T. solium*), got consecutively violent headache, central deafness, psychical symptoms, convulsions, rise of temperature; he became unconscious, paralytic, and died with symptoms of pulmonary oedema 5 days after the taking of the drug. No post-mortem examination could be made.

W. J. Bais.

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[No. 6]

KALA AZAR.

YOUNG (Charles W.). **Recent Research on the Leishmaniases outside of China.**—*China Med. Jl.* 1927. Nov. Vol. 41. No. 11. pp. 900-909. [44 refs.] [Union Med. College, Peking.]

During 1926 the author made a tour of various places where work on leishmaniasis was being carried out. His itinerary included Assam, Calcutta, Bagdad, Aleppo, Beirut, Jerusalem, Naples, Tunis, Hamburg and New York. He mentions the investigators and the researches they are conducting. In most cases the results have already been published, but one or two interesting points come to light. While in Beirut the author saw the first case of kala azar to be diagnosed microscopically in the Lebanon. It was in an infant 8 months old from near Tripoli, 50 miles north of Beirut. In connexion with the transmission of oriental sore and the possibility of *Phlebotomus papatasi* being the vector, it is stated that: "Nobody yet has transmitted leishmaniasis experimentally, so far as I am aware, with the exception of a single instance in a series of bed-bug experiments by Dr. Hertig and myself." Experiments with bed-bugs were described by these observers in 1926 (this *Bulletin*, Vol. 23, p. 580), but they were quite unsuccessful as regards transmission. The reviewer is not aware that the positive result has been previously mentioned.

C. M. Wenyon.

SHORTT (H. E.), DAS (Sribas) & LAL (Chiranji). **The Finding of Parasites in the Peripheral Blood of Kala-Azar Cases by Direct Microscopical Examination.**—*Indian Jl. Med. Res.* 1927. Oct. Vol. 15. No. 2. pp. 529-538. [18 refs.]

Though it is generally known that leishmania occur in the peripheral blood of cases of kala azar and can be discovered in blood films, the finding of parasites often requires a lengthy search, the number of successes obtained depending on the patience of the observer. The authors describe a method of making the blood films which renders search for the parasites a simpler matter.

"A small drop of blood is placed at one end of a slide; a second slide is applied to it, as in making an ordinary blood smear. The second slide, as soon as the blood has spread out along its edge, is pushed along the surface of the first with an even motion until the blood is almost exhausted. At this point, instead of continuing this motion, as in making an ordinary

smear, the second slide is abruptly lifted off, with the result that the blood smear ends in a straight edge stretching transversely across the slide. This straight edge is somewhat thicker than the rest of the smear and contains a large percentage of the total white cell content of the drop of blood. The white cells in the straight edge are all that it is necessary to examine for the purpose of determining, with a fair degree of accuracy, the presence and numbers of Leishman-Donovan bodies in the peripheral blood."

As a routine the terminal edges of 4 slides were examined for parasites. None of the thick film methods, including that advocated by KNOWLES and GUPTA (this *Bulletin*, Vol. 22, p. 195) approaches in simplicity and efficacy the method described here.

Of 455 cases of kala azar 358, or 78·7 per cent., showed parasites in the peripheral blood. These were contained in 2,168 cells which on an average gives 1·5 parasitized cells per slide. Of these cells 49·9 per cent. were polynuclears and 50·1 per cent. mononuclears of various types. The cells contained in all 3,210 parasites, giving the average number of parasites per slide as 2·3. The largest number of parasites seen in one slide was 183 and the largest number in a single cell 41. As the clinical condition of the patients at the time of blood examination varied it was possible to correlate to some extent the blood findings with the symptoms. As a general rule, if there is marked leucopenia the parasite rate is low and, conversely, when there is a high leucocyte count the parasite count will be high. A temperature above the normal has the effect of increasing the parasites in the peripheral blood. The existence of alimentary trouble—diarrhoea and dysentery—does not appear to increase the blood parasites. In general the stage of the disease does not affect the finding of parasites, except that very early cases are frequently negative. On the other hand, the disease does not as a rule develop uniformly, but by a series of periodic exacerbations. At such times parasites are more readily found, and it can often be noted that many of them are in process of division, an indication that active multiplication is taking place. When any form of antimony treatment is instituted there is rapid disappearance of parasites from the peripheral blood, a fact which is of great importance from the point of view of the campaign against the spread of the disease in Assam by the treatment method.

In addition to the proved cases of kala azar to which the above remarks refer, a number of other cases of splenomegaly were examined from the point of view of this disease. In the particular district of Assam there is a great prevalence of quartan malaria which often produces a great enlargement of the spleen. Furthermore, cases of enormous enlargement of the spleen were met with, chiefly in young adults of outwardly healthy appearance. There was always a history of many years' duration. Careful examination did not lead to the discovery of any parasite which could be considered as the cause of the condition.

C. M. W.

CHOPRA (R. N.), GUPTA (J. C.) & BASU (N. K.). **The Antimony Test in the Diagnosis of Kala-Azar.**—*Indian Med. Gaz.* 1927. Dec. Vol. 62. No. 12. pp. 688-691. [4 refs.]

In this paper the authors give further evidence of the value of the antimony serum test for kala azar. They point out that fallacies may result if special attention is not paid to the character of the precipitate

which forms at the junction of the serum and urea stibamine solution. In cases of kala azar it is definitely flocculent, is not easily broken up by shaking and does not disappear in 24 hours. In certain other diseases a non-flocculent precipitate may form. In case of doubt it is a good procedure to dilute the serum with 8 to 10 volumes of distilled water and to repeat the test. Compared with the aldehyde reaction the antimony test gives the better results.

C. M. W.

SEN (Atindra Nath). **Urea Stibamine Solution as a Test in Kala-Azar.**—*Indian Med. Gaz.* 1927. Dec. Vol. 62. No. 12. pp. 692-695.

The antimony test was applied to the sera of 42 patients, of whom 20 were suffering from kala azar. All the kala azar cases gave a positive result, as also did 1 case of ankylostomiasis and 3 cases of pulmonary tuberculosis.

C. M. W.

SANYAL (Charuchandra). **A Simpler Method of testing Kala-Azar Blood. (Simplified Urea-Stibamine Test.)**—*Med. Review of Reviews.* Calcutta. 1927. Dec. Vol. 2. No. 12. p. 529.

As a modification of the antimony test in kala azar the author suggests the following procedure. When the drug (urea-stibamine or amino-stiburia) in solution in distilled water is to be injected into a vein, before the actual injection is commenced, a drop of blood is aspirated into the syringe, after which the contents of the syringe, with the exception of 0.1 to 0.3 cc. are injected. The needle is withdrawn and about 2.3 cc. of distilled water is drawn into the syringe and mixed with the blood mixture which has remained in the syringe. In kala azar cases the mixture is distinctly opaque, but as the patient improves under treatment the opacity diminishes till finally in many cases, as a cure is obtained, the solution is transparent. The reaction is thus a guide to the progress of the case.

C. M. W.

FABRIS (Stanislao). Sull'azione dei preparati organici di antimonio sul siero di sangue nella leishmaniosi infantile. [**Action of Organic Antimony Preparations on the Blood Serum in Infantile Kala Azar.**—*Pediatrics.* 1928. Jan. 1. Vol. 36 No. 1. pp. 5-14. [15 refs.] [Inst. of Clin. Pediatrics, R. Univ., Naples.]

The author has applied the antimony test to 25 cases of infantile kala azar in Italy, employing as controls 65 healthy children and 245 others suffering from various diseases. His results are in agreement with those obtained by CHOPRA and his co-workers in India.

C. M. W.

SINTON (J. A.). **Kala-Azar at High Altitudes.** [Correspondence.]—*Indian Med. Gaz.* 1927. Dec. Vol. 62. No. 12. p. 723.

In connexion with the discovery of indigenous kala azar at Sanawar in the Simla Hills, it was noted that the only species of sandfly recorded from this locality was *Phlebotomus major* (ante, p. 60). The writer of the letter points out that in a collection of sandflies from this

locality he has found specimens of *P. argentipes*. Previous experience led to the view that this fly did not occur at altitudes above 2,000 feet whereas Sanawar village is above 4,000 feet.

C. M. W.

SHORTT (H. E.) & SWAMINATH (C. S.). **The Method of Feeding of *Phlebotomus argentipes* with Relation to its Bearing on the Transmission of Kala-Azar.**—*Indian J. Med. Res.* 1928. Jan. Vol. 15. No. 3. pp. 827-836. [3 refs.]

The feeding habits of the sandfly *Phlebotomus argentipes* have been studied by direct observation during the feeding act and by the examination of sections of the skin which have been fixed with the feeding sandfly *in situ*. It has been noted that, contrary to the generally accepted view, the sandfly during the feeding act, which occupies 2 to 5 minutes, ejects droplets of fluid from its hind gut. As *Leishmania donovani* develops only in the anterior part of the midgut and further forwards, any flagellates which might appear in these droplets would have been washed backwards from the midgut in the current of inflowing blood. Attempts to discover flagellates in the droplets have so far failed, but it has to be recognized that, especially in the case of sandflies which puncture the skin in several places, the puncture wounds might be contaminated with the ejected droplets. Examination of sections shows that the channel through which the blood flows in the proboscis is in its narrowest part wide enough for 3 blood corpuscles to lie abreast. In the case of sandflies heavily infected with flagellates it would appear impossible for blood to flow along the channel into the midgut till the plug of flagellates had been dislodged, and this could only take place in a forward direction. It would seem that in such cases a plug of flagellates would be injected into the wound. As regards the discovery of flagellates in the skin around the proboscis, no definite result has been obtained, though certain bodies resembling flagellates have been seen.

C. M. W.

GERSCHENOWITSCH (R. S.). Kombinierte Erkrankung an Hautleishmaniose, verbunden mit Kinderleishmaniose. [**Concurrent Infection with Kala Azar and Dermal Leishmaniasis.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1928. Jan. Vol. 32. No. 1. pp. 25-32.

Though in most parts of the world where leishmaniasis occurs there does not appear to be any overlapping of the endemic centres of kala azar and oriental sore, this is not the case in Central Asia where the two diseases occur side by side, not only in a district but even in one house and one family. In one case it was noted that a year before a young girl fell ill with kala azar the mother had been suffering from oriental sore, while in another a girl was found to have kala azar and a younger brother oriental sore. A still more interesting case was that of a woman who brought her 13-months-old infant for treatment. The woman was suffering from oriental sore and the infant from this disease and kala azar. A complete cure was obtained by intravenous injections of tartar emetic.

The author discusses the significance of the cases he describes and concludes that in Central Asia there is no complete antagonism as regards

the geographical distribution of cutaneous leishmaniasis and kala azar. Recovery from a cutaneous infection does not necessarily protect from a subsequent infection of the same type, nor from infection with the virus of kala azar. A concurrent infection with the two viruses does not influence the course of the disease produced by either.

C. M. W.

ARTAMONOW (A. S.). Sur un cas de leishmaniose cutanée et viscérale chez un enfant d'onze mois. [**A Case of Dermal and Visceral Leishmaniasis in a Child of 11 Months.**].—*Russian Jl. Trop. Med.* 1927. Vol. 5. No. 9. French summary p. 603. [In Russian pp. 542–543.]

A child 11 months old in Bokhara had an oriental sore on the right cheek and was at the same time suffering from kala azar. Diagnosis was made by discovery of *Leishmania tropica* in scrapings from the sore and *L. donovani* in spleen puncture material.

C. M. W.

STRUTHERS (Ernest B.). **The Treatment of Kala Azar by Stibosan (Heyden 471) and Antimosan (Heyden 661).**—*China Med. Jl.* 1927. Sept. Vol. 41. No. 9. pp. 755–760.

Of the 2 drugs mentioned, stibosan appears to be the better. A series of 7 cases of kala azar treated with it resulted in 6 cures and one death. The average duration of treatment in the 6 cured cases was 6 weeks. Injections were given 3 times a week, a commencing dose of 0.05 gm. being gradually increased to a maximum of 0.2 gm., which was continued so long as reactions or other unfavourable symptoms did not appear. It is concluded that stibosan, which is much less toxic than the antimony tartrates, is a valuable addition to the organic preparations of antimony for the treatment of kala azar.

Antimosan was not so effective, but in view of its very low toxicity it may be used with very debilitated patients and especially in conjunction with some other drug. One patient, a boy of 7, responded remarkably to antimosan, though on admission the condition was very serious, there being cancrum oris of the right cheek, with inability to talk or feed, and only partial consciousness. There did not appear to be any prospect that the boy would live more than 2 or 3 days. Antimosan in full doses, 1 cc. (5 per cent. solution), 1.5 cc. and 2 cc. were injected on 3 successive days. By the fifth day there was marked improvement and a few days later the boy was running about the ward. On the fortieth day after admission he was discharged as probably cured.

C. M. W.

CHOPRA (R. N.) & GUPTA (C. R. Das). **Provocative Action of Organic Compounds of Antimony in Leishmaniasis.**—*Indian Jl. Med. Res.* 1928. Jan. Vol. 15. No. 3. pp. 565–570. [2 refs.]

It has been shown in animals that administration of antimony compounds produces a marked increase in volume of the liver and spleen, as also an augmentation of the rhythmic movements of these organs [*ante*, p. 412]. The feeling of fullness and discomfort complained of by many patients after treatment with antimony derivatives is probably due to this action of the drug. The increased rhythmic movements

and the engorgement produce rupture of the endothelial cells with consequent liberation of leishmania which appear in the blood. Injections of antimony compounds have therefore a provocative action in those cases of kala azar in which fibrotic changes in the liver and spleen are not too advanced, in that they may cause parasites to appear in the peripheral blood.

C. M. W.

YOUNG (Charles W.) & HERTIG (Marshall). **Peripheral Lesions produced by *L. donovani* and Allied Leishmaniae.**—*Proc. Soc. Experim. Biol. & Med.* 1927. Dec. Vol. 25. No. 3. pp. 196-197. [6 refs.] [Peking Union Med. College, Peking.]

Working with certain strains of leishmania the authors have found that the initial visceral infection produced by them in the Chinese striped hamster (*Cricetulus griseus*) is followed by the appearance of peripheral lesions. Five culture strains were obtained from Tunis, where they had been kept by repeated subculture for varying periods up to 15 years. The strains comprised 2 of *Leishmania donovani* (Mediterranean type), 2 of the Mediterranean canine type, and 1 of *L. tarentolae*, obtained originally by culture from the blood of the gecko. [The statement is made that all of these originally produced visceral lesions only, but whether this refers to their own observations or those of others the authors do not make clear. The reviewer is not aware that any observer has hitherto recorded the production of visceral lesions in animals by the inoculation of *L. tarentolae*] However, the authors now state that with all the 5 strains intraperitoneal inoculation of hamsters produces at first a visceral infection, with enlargement of the liver and spleen and with leishmania fairly abundant in the smears of the spleen, liver, bone marrow and heart blood. After a lapse of from 2 months to over a year from the time of inoculation, bilaterally symmetrical lesions began to appear in the following order: (1) swelling of the carpi and tarsi, extending later to the feet, including the digits; (2) swelling of the posterior half of the scrotum in males, with subsequent ulceration (infiltration and enlargement of the clitoris, exceptionally with ulceration of the perineum, in the female); (3) swelling (infiltration) and later ulceration of the base of the tail; (4) similar swelling of the nose, rarely with ulceration; and (5) swelling and ulceration of the margins of the ears. From the swollen tissues leishmania enclosed in clasmato-cytes were obtained, often in large numbers. In the lesions of the feet the clasmato-cytes were present often in enormous numbers between the fibres of the ligaments from the carpi and tarsi and distally. In the lesions showing ulceration the clasmato-cytes were in the deep layers of the skin and subcutaneous tissues. Intraperitoneal inoculation of the tissues from these peripheral lesions produced the same picture in 2 to 4 months and have continued to do so consistently and repeatedly. The same pathological changes were obtained with all the 5 strains. As the peripheral lesions developed the infection of the internal viscera subsided so that at autopsy some of the animals had spleens and livers which were normal in size and negative to leishmania, both by direct microscopical observation and inoculation of hamsters.

Similar lesions of a single extremity were found in hamsters inoculated with two Chinese strains of *L. donovani*. These animals, which had a heavy visceral infection, had had the four extremities constricted

by tying for feeding experiments with insects several months before the appearance of the peripheral lesions. Inoculation of hamsters from these peripheral lesions produced only a general visceral infection like that caused by the strains with which the animals had been originally infected. Two strains of *L. donovani* isolated by ACTON and KNOWLES in Calcutta from skin lesions ("xanthoma" strain, and "dermal leishmanoid" strain) produced only visceral infections. From these observations it would appear that the 4 Mediterranean strains of *L. donovani* (2 infantile and 2 canine) behaved alike in leading to visceral infections followed by peripheral lesions in hamsters, while 2 Indian strains and 2 Chinese strains (apart from the lesions which were possibly the result of trauma) produced only visceral lesions. The fact that the naturally occurring gecko parasites (*L. tarentolae*) should behave like the other Mediterranean strains is remarkable, as all evidence at present available has tended to indicate that it had no relationship with the human parasites. All the Mediterranean strains, however, resembled one another in their long maintenance in the culture tube, while the Indian and Chinese strains had been more recently isolated. It would be of considerable interest to compare the behaviour in hamsters of recently isolated strains of all the types.

C. M. W.

ZOZAYA (Carlos). Das Blutbild bei der experimentellen Hamster-Leishmaniosis. [**The Blood Picture in Experimental Leishmaniasis of the Hamster.**—*Abhandl. a. d. Gebiet d. Auslandskunde. Hamburg. Univ.* 1927. Vol. 26. (D., Med. & Vet. Vol. 2.) [Festschrift NOCHT.] pp. 628-630. [2 refs.] [Inst. for Ship & Trop. Diseases, Hamburg.]

During the course of a *Leishmania donovani* infection in the European hamster (*Cricetulus frumentarius*) examinations of the leucocytes of the blood were made. It was noted that there was a leucopenia while the percentage of the lymphocytes was increased at the expense of the polynuclears. The mononuclears decreased in number while the plasma cells increased from 1 to 4 per cent.

C. M. W.

NAPIER (L. Everard). **The Infectivity of the Flagellate Form of *Leishmania donovani*.**—*Indian Jl. Med. Res.* 1927. Oct. Vol. 15. No. 2. pp. 481-483. [2 refs.]

With a view to arriving at some conclusion as to the influence of age of cultures of *Leishmania donovani* on their infectivity to mice, a series of 66 animals was inoculated intraperitoneally, each receiving all the flagellates it was possible to remove from a single tube of N.N.N. medium. The mice were kept for periods of 3 to 4 months, when they were killed and examined by the smear and culture methods. Of the 66 mice, 44 were examined in this way, and 15 were found infected. Of 14 mice inoculated with cultures less than 6 days old, 3 were infected: of 18 inoculated with cultures less than 12 and more than 6 days old, 7 were infected: of 12 inoculated with cultures more than 12 days old, 5 were infected. It is evident that the early flagellate forms are capable of producing infection, though less readily than the older cultures in which, however, the flagellates were much more numerous. If allowance be made for the richness of the older cultures, it would appear

that the younger cultures are actually more infective. The cultures used were all primary cultures commenced by inoculating the tubes with spleen puncture material.

C. M. W.

GRAHAM (J. D.). Les recherches sur le kala-azar dans l'Inde Britannique pendant l'année 1926. [**Researches on Kala Azar in British India, 1926.**]—*Bull. Office Internat. d' Hyg. Publique.* 1927. Oct. Vol. 19. No. 10. pp. 1439-1452. [1 ref.]

The report gives a general summary of the investigations of the Kala Azar Commission working in Assam and of those of the School of Tropical Medicine at Calcutta. These have already been noted in the reviews.

ARAUJO (H. C. de Souza). Sur le kala-azar aux Indes et le bouton d'Orient à Bagdad. [**Kala Azar in India and Oriental Sore in Bagdad.**]—*C.R. Soc. Biol.* 1928. Mar. 2. Vol. 98. No. 8. pp. 637-639. [Oswaldo Cruz Inst., Rio de Janeiro, Brazil.]

In Calcutta the author was shown the work which was being carried out on kala azar. He relates his experiences but does not give any new information regarding this disease.

FERNÁNDEZ MARTÍNEZ (Fidel). Sobre distribución geográfica del kala-azar en España. [**Geographical Distribution of Kala Azar in Spain.**]—*Siglo Méd.* 1927. Oct. 1. Year 74. Vol. 80. No. 3851. pp. 322-324.

Cases of kala azar have been noted in all the provinces of the Mediterranean littoral including Cadiz. The disease is, however, more common in the provinces north of Alicante. Another important endemic area comprises Madrid, Cáceres, Toledo and a small part of Badajoz, while a small focus occurs in Córdoba.

SAENZ DE SANTA MARÍA Y MARRÓN (R.). Contribución al estudio de la leishmaniosis infantil. [**Case of Infantile Kala Azar.**]—*Siglo Méd.* 1927. May 14. Year 74. Vol. 79. No. 3831. pp. 542-544. With 1 text fig.

Description of a case of kala azar in a boy 4 years of age in Rioja in the province of Logroño in Spain. The case indicates that the disease extends further north than has hitherto been supposed.

MATARANGAS (G.). Le kala-azar en Grèce. [**Kala Azar in Greece.**]—*Bull. Office Internat. d' Hyg. Publique.* 1927. Oct. Vol. 19. No. 10. pp. 1453-1454.

A short note on the distribution of kala azar in Greece. No new information is given.

C. M. W.

CHATTERJEE (Khagendra Nath). **An Instance of Toxicity of Urea-Stibamine.**—*Med. Rev. of Reviews.* 1927. Oct. Vol. 2. No. 10. pp. 463-464.

During the treatment of a case of kala azar with urea stibamine there developed alarming symptoms of multiple neuritis, with consequent loss of power of movement in the limbs, tongue and palate, and the appearance

of other serious symptoms. The injections were discontinued, the patient not commencing to improve for about a month. Ultimately there was complete recovery.

C. M. W.

METELKIN (A. I.). Zur Frage der diagnostischen Bedeutung von Keratitis und Konjunktivitis bei der Leishmaniosis der Hunde. [**The Question of the Diagnostic Importance of Keratitis and Conjunctivitis in Canine Kala Azar.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1928. Jan. Vol. 32. No. 1. pp. 41–43. [5 refs.]

Several authors have drawn attention to the occurrence of keratitis and conjunctivitis in dogs suffering from visceral leishmaniasis and have even considered the keratitis to be of diagnostic importance in areas where canine kala azar occurs. The author, who has had considerable experience in Turkestan, has come to the conclusion that keratitis is of very common occurrence and is due to many causes, only one of which is leishmaniasis, so that this sign in itself cannot be regarded as of diagnostic importance.

C. M. W.

PARROT (L.), DONATIEN (A.) & LESTOQUARD (F.). Notes expérimentales sur le bouton d'Orient et sur la leishmaniose canine viscérale. [**Experiments with Oriental Sore and Canine Kala Azar.**]—*Arch. Inst. Pasteur d'Algérie.* 1927. June. Vol. 5. No. 2. pp. 120–130. With 9 figs. on 4 plates. [Pasteur Inst., Algiers.]

As first demonstrated by LAVERAN, the inoculation of *Leishmania tropica* into the testis of the mouse gives rise to a tumour which contains large numbers of parasites. With material from tumours of this kind attempts were made to vaccinate monkeys against *Leishmania tropica* and the canine strain of *Leishmania donovani*. By inoculation into the skin of virus from the mouse oriental sore was produced in 11 monkeys. The incubation period varied from 7 to 17 days, and healing took place in from 53 days to 5 months. There first appeared a papule which quickly became a definite intradermic nodule. With increase in size scaling of the surface occurred. Finally there was ulceration covered by an adherent scab. In one case secondary sores developed along the course of the lymphatics. Two monkeys were inoculated subcutaneously with virus from the mouse, killed by heating to 56° C. for half an hour, and 2 intracutaneously with a similarly killed virus. The 4 monkeys were later inoculated with living virus and developed typical lesions. Two other monkeys were inoculated subcutaneously with living virus. Later intracutaneous inoculation of living virus produced definite lesions. The attempts at vaccination had thus failed. Five monkeys which had recovered from oriental sore were re-inoculated intracutaneously with living virus. Two which had recovered from the first infection one month before did not react to the second inoculation. Two which had recovered 4 months and less than one month before developed abortive lesions, while one which had recovered 2 months before showed no immunity whatever.

A monkey inoculated intracutaneously in 2 places with *Leishmania donovani* from the spleen of a heavily infected dog developed nodules but only scanty leishmania were found in them. Complete recovery occurred in a little over 4 months. Re-inoculation with *Leishmania*

BERIBERI.

THIERFELDER-THILLOT (M.). Hypovitaminose als Grundlage für das "maligne Syndrom" (akute maligne Beriberi). [**Hypovitaminosis as Basis for Acute Beriberi.**]—*Abhandl. a. d. Gebiet d. Auslandskunde. Hamburg. Univ.* 1927. Vol. 26. (D., Med. & Vet. Vol. 2.) [Festschrift NOCHT.] pp. 556-560. [1 ref.]

The rôle played by vitamin deficiency in the production of the symptom complex of acute malignant beriberi is here discussed. The author instances the following:—

Observation 1. A boy, aged 12 years, had lived on a diet rich in all vitamins until taken as servant to a Malay family. Here the diet mainly consisted of rice, and this poor in quantity and quality. This diet was apparently sufficient for the other servants, who were accustomed to it, but after a time the boy in question developed symptoms of acute beriberi, and in spite of attempts to increase his diet, he died in a very short time.

Observation 2. Deals with a crew of four men, one a Japanese and three Malays, who were kept at sea under very bad weather conditions on a diet of rice, dried fish and preserves. The voyage lasted three months, and about a fortnight before landing the Japanese died after a short illness. On arrival two of the remaining members of the crew were admitted to hospital, where they died within twenty-four hours. Both presented symptoms of acute beriberi and at the autopsy on one of them the heart muscle was found to be normal.

Observation 3. Of thirty Papuans living under exactly the same conditions three became suddenly ill with dyspnoea and burning in the stomach. On examination cyanosis and enlargement of the liver were found. The temperature was normal. All three cases died after an illness of a few hours' duration and at autopsy enlargement of the liver and stasis in all organs were the sole findings. The remaining Papuans were then admitted to hospital and fed with a diet rich in vitamins with the result that no further cases occurred. The diagnosis was acute beriberi and not acute infectious disease.

Conclusions. The author remarks upon the similarity between this syndrome and that due to acute suprarenal insufficiency, as described by SERGENT and BERNARD. These investigators grouped acute suprarenal insufficiencies into three categories, viz. subacute, acute and hyper-acute. The patients recorded in the above three observations will be seen to fall into these groups in the order given.

The reason why cases showing this syndrome are so acute is that the vitamin deficiency followed suddenly upon a prolonged period of living on a normally balanced diet. On the other hand, the more chronic forms of beriberi seem to occur amongst those who are constantly living on the brink of vitamin deficiency.

A. D. Bigland.

LEGER (Marcel). Le bérubéri n'est pas une maladie d'origine alimentaire. [**Beriberi not a Disease of Dietetic Origin.**]—*Rev. Prat. Malad. des Pays Chauds.* 1927. Oct. Year 6. Vol. 7. No. 10. pp. 528-539.

The association between beriberi and rice is considered in the form of a review. The subject naturally lends itself to chronological treatment.

Though dried fish, or insufficient fat or nitrogen in the diet were held responsible by some workers, for a long time it had been recognized that endemic beriberi occurred among those races whose basal diet was rice. In 1897 EIJKMAN showed that in the prisons of Java the beriberi death rate was 284 per 10,000 in those institutions where polished rice was used and only 1 per 10,000 in those using "red rice." These findings were confirmed by experiments on fowls.

The work of THÉZÉ, GOUZIE, FARGIER and HIGHET gave further evidence that in various outbreaks of beriberi, for the prevention of which they were responsible, the substitution of incompletely decorticated rice for the polished variety was the deciding factor.

Such observations led to the unanimous view of the second International Congress of Medicine in the Far East (1911) that beriberi is associated with the constant taking of polished rice as the principal substance in the diet.

Further work culminating in the researches of FRASER and STANTON (1911) showed a connexion between decortication of rice and loss of phosphorus content but, more important still, that rice in the process of polishing loses a protecting substance. It remained for FUNK to show that this substance is a vitamin and to make clear the difference between starvation and avitaminosis.

Since then, from time to time, work has been described which has thrown doubt upon the connexion between vitamin B deprivation and beriberi. The following may be quoted briefly :—

1. OGATA and others have shown that while the tissues and organs of polyneuritic birds have a markedly lowered vitamin B content this is not true of human beriberi cases.

2. MACCARRISON (1924) found that a sample of rice incapable of producing beriberi in man did so in the pigeon, and also that rice obtained from an area where beriberi was very active did not cause the disease in pigeons and on analysis was found to contain a large quantity of vitamin B.

3. MARCHOUX described an outbreak of beriberi in France among Asiatic troupes which received a diet richer in vitamins than did their European colleagues in the same neighbourhood. But the Asiatics consumed polished rice instead of bread and the epidemic disappeared with the suppression of the rice.

4. A similar epidemic in France was described by NORMET.

These and other considerations (e.g., institutions which received rice from the same source having beriberi in some and not in others, etc.) lend some support to the toxi-infectious theory. Examples are quoted suggesting that the disease can be spread by direct contact, but the work of NOEL BERNARD and his colleagues upon the connexion between beriberi and the "B. Asthenogenes" is in the author's opinion of the greatest importance.

The two views upon beriberi etiology can be united. The polishings of rice play a protective rôle in maintaining digestion and in counter-acting by the contained phosphates, fat, magnesium and vitamins the bad effect of excessive carbohydrate. Polished rice is more easily contaminated by organisms than the natural variety. In short, rice itself is no more a cause of beriberi than the marsh is of malaria.

A. D. B.

CHAPMAN (Leland S.). **Infantile Beri-Beri in Panama. A Preliminary Report.**—*Proc. Med. Assoc. Isthmian Canal Zone.* 1921-1926. Vol. 14. pp. 37-48.

Infantile beriberi was first described by HIROTA in Japan in 1888. The infant mortality in the Philippines was very great at this time and in 1904 HIROTA's diagnosis was adopted for many of the cases in those islands. That this was correct is suggested by ALBERT who in 1908 reported on the first case with full clinical and pathological details. Beginning in 1915 the diagnosis was made with increasing frequency in the hospital (Panama Zone) where the following observations were made: The findings are collected from 19 cases which showed the lesions of the disease at autopsy. The clinical and post-mortem appearances closely resemble those noted in the Philippine Islands and Japan except in one respect, viz. the etiology. Whereas in other localities the mothers nursing the children were themselves suffering from beriberi, in the cases here described eight were not breast fed, four only intermittently and in six there was no history.

Details of findings in 19 cases.—All children in this group were born in the Republic of Panama or on the Canal Zone and the parents were British West Indians, with one exception. Thirteen were boys and seven girls [*sic*]. Deaths occurred from the second month up to the end of the first year. The youngest admission to hospital was a baby only 49 days old. No seasonal incidence was noted. The onset of the disease was nearly always insidious and often the first thing noted by the mother was a heart attack. Six cases died suddenly before admission, while of the remaining thirteen eight died within twelve hours of admission, one lived for 27 hours and only four lived for some days. Symptoms such as vomiting, anorexia, diarrhoea, swellings, etc., had been noted in some cases.

The children, with only one exception, were well nourished. In eleven cases oedema was recorded, in five cyanosis and in five anaemia. The average pulse rate was 140 and there was no cardiac enlargement. Dyspnoea was common (40-60). Pleural effusions were not found clinically. Six cases had abdominal distention and in thirteen no mention of the abdomen was made. Ten showed liver enlargement. As regards the nervous system few data were available. The knee jerks were absent in three, sluggish in three and normal or active in four. Kidney function was only disturbed in two cases and though albumen was found in the urine of six after death it was not present in two of these before death. In all those examined an anaemia was found and the blood Wassermann reaction proved negative in all the thirteen cases tested.

The autopsy findings are particularly in agreement with those described in the Philippines and Japan, viz., "an apparently well nourished child, the skin pale, the body swollen, with local or generalized oedema which pits on pressure, and on section an hypertrophied and dilated right heart, its musculature coarse, stiff and firm; the wall of the right heart equalling or exceeding in thickness that of the left heart; congestion of the viscera and absence of other findings sufficient to account for death." To these findings may be added moderate pleural effusions in nearly all cases, also a fatty infiltration of the liver.

One case is described in the fullest detail both clinical and post-mortem.

A. D. B.

KATSURADA (Fujiro). Ueber die "Beriberi" auf japanischen Schiffen. [**Beriberi on Japanese Ships.**—*Abhandl. a. d. Gebiet d. Auslandskunde. Hamburg. Univ.* 1927. Vol. 26. (D., Med. & Vet. Vol. 2.) [*Festschrift NOCHT.*] pp. 223-224. [1 ref.] [Inst. for Ship & Trop. Diseases, Kobe, Japan.]

Twenty years ago beriberi being very prevalent in Japanese ships sailing from Kobe, it was decided that an alteration in the diet was indicated. This took the form of mixing rye with the rice in the proportion of 3 to 7. Following this readjustment the incidence of the disease fell considerably. Thus in the years 1915-1924 the percentage of beriberi in all hospital admissions was 9.4 and in the last two years—1925 and 1926—this figure has fallen to 7.3.

The author remarks upon the occurrence of beriberi following infectious diseases. In this respect malaria seems to play an important rôle. An instance is quoted of a Japanese ship on the return journey from South America, in which the crew developed malaria. This was immediately followed by an outbreak of beriberi which, in some instances, assumed an acute and fatal form. The argument is continued by quoting eleven sporadic cases of beriberi out of a total of 58 which immediately followed an attack of malaria.

A. D. B.

GRAHAM (J. D.). La production expérimentale du bérubéri. [**Experimental Production of Beriberi.**—*Bull. Office Internat. d'Hyg. Publique.* 1927. Oct. Vol. 19. No. 10. pp. 1477-1480. With 1 diagram.

This communication takes the form of a note presented before the Comité de l'Office International d'Hygiène Publique 1927, by Lt.-Col. J. D. Graham, I.M.S., and deals with the researches carried out in MACCARRISON'S Laboratory.

Polynuritis columbarum and true beriberi in pigeons are two distinct conditions. In the former, in addition to polynuritis, the heart is atrophied, whereas in the latter cardiac hypertrophy and degeneration are present. This cardiac condition is the essential feature of true beriberi.

Experiments on upwards of 2,000 animals have demonstrated that beriberi is not caused by the absence of vitamin B in the food but by the combined action of insufficiency of this factor and a toxin. This toxin is not produced in rice by microbial agency but seems to be of metabolic origin.

A diet of decorticated rice does not give rise to true beriberi in pigeons. But add to this diet dhal arhar (0.8 grammes a day for each bird), then in 25 per cent. of the birds the true disease will develop. (Dhal arhar is a yellow pea which is reduced to powder and taken by the natives as a pap or pulp. This vegetable is habitually consumed by rice eating peoples). Similarly true beriberi is produced by feeding with rice, the grains of which have been in an autoclave at 130° C. for two hours in an alkaline medium, thus reducing its vitamin B content to the requisite point. If it be supposed that the figure 100 represents the amount of vitamin B necessary to keep pigeons in health on any given diet then true beriberi will occur at figures varying between 75 and 90. Reducing the vitamin content still lower, to the figure 50 or below, will cause polynuritis columbarum. It is possible to cause the

disease (true beriberi) either by adding a quantity of dhal to the decorticated rice diet, thereby *increasing* the vitamin B content to 75-90 or by autoclaving a rich vitamin food, thus *reducing* the vitamin value to the figure 75-90. (These results are shown in a graph.).

Further, lightly milled or half-boiled rice contains a vitamin figure of 75-90 and thus can cause true beriberi in pigeons but when dhal (0.2 gm. per bird per day) is added, so that the content is increased to 100 or more, the animals are completely protected; thus proving that rice itself does not contain the poison. By this expedient the propagation of beriberi in a Burmese prison was stopped.

In India true beriberi occurs during the monsoon period amongst those who take 1½-2 lb. of decorticated rice and 1-2 oz. of dhal. Cold and wet weather affects the suprarenals and also reduces the value of the rice in vitamin and P_2O_5 content. This is not true of white flour, which contains much more vitamin B than does decorticated rice and therefore the West is almost immune against beriberi.

In short, true beriberi is not due to a complete absence of vitamin B, but to an insufficiency of this factor. This degree of insufficiency occasions the production within the organism of a poison which exercises a specific action on the heart and is the essential cause of the disease. Other diseases resembling beriberi but of different etiology ought not to be placed in the same category.

A. D. B.

LUTHER (S.). **Rational Treatment of Beri-Beri.**—*Malayan Med. Jl.* 1927. June. Vol. 2. No. 2. pp. 61-62.

The method recommended and used in a small number of cases of dry beriberi was that of immersing the patients' legs in a bucket of heated rice-washings and bathing them continually from the knee downwards with the fluid. It is stated that marked improvement is noticed in a week and in three to four weeks paralytics can generally walk. Backward infants in Southern India are frequently treated in a similar way. The beneficial effect is attributed to the vitamin B contained in the rice washings being absorbed through the skin.

P. W. Bassett-Smith.

GUPTA (Nalini Ranjan Sen). **The Present Epidemic of Dropsy.**—*Med. Rev. of Reviews.* Calcutta. 1926. Oct. Vol. 1. No. 10. pp. 436-446.

The author writes that the epidemic of dropsy under review is the 4th or 5th in Calcutta, and that many cases of cardiac or eye trouble date back to a similar epidemic. He refers to the large infection roll, the tragic suddenness of the fatal result, and the protean manifestations of the disease. It differs from beriberi of the text-books in that there are no signs of peripheral neuritis in the extremities and the knee jerks can always be obtained except when oedema forms a mechanical obstruction to their elicitation. Discussing the etiology he says there have been many cases among the well-to-do, and that most of the worst cases have occurred in damp one-storied houses and expresses the opinion that the disease is due to some infection which gains entry by the gastrointestinal route. The symptoms are, oedema, gastro-intestinal symptoms—usually diarrhoea, cardiac dilatation and tendency to syncope, tendency to haemorrhages, enlarged liver, congested or

oedematous lungs, tendency to glaucoma, fever. The heart symptoms vary from slight dilatation to acute cardiac failure. The objective signs are a diffuse wavy impulse, often outside the normal position, and frequently nothing else. The haemorrhages occur from almost every orifice and distinguish this disease from ordinary beriberi. The gastrointestinal symptoms often vary inversely with the cardiac, diarrhoea bringing relief and constipation cardiac embarrassment. With rest and proper treatment fatalities are rare. The great majority of deaths have occurred in persons suffering from an apparently mild form. [No figures are given in Dr. Gupta's paper and nothing is said about the food consumed.]

A. G. B.

- i. BANERJEE (Saurindra Mohan). **Epidemic Dropsy.**—*Indian Med. Rec.* 1926. Dec. Vol. 46. No. 12. pp. 367-370.
- ii. BRAHMACHARI (N.) & THAKUR (Harshad Lal Shanker Lal). **A Study of 407 Cases of Epidemic Dropsy.**—*Calcutta Med. Jl.* 1926. Dec. Vol. 21. No. 6. pp. 272-280.

i. This concerns the epidemic in Calcutta popularly called beriberi. The author thinks that it is not true beriberi because: (1) fever is present in almost all the severe cases; (2) eruptions, roseolar or petechial, are very common; (3) there are few or no symptoms of neuritis, no muscular tenderness, no anaesthesia [there is no reference to cardiac symptoms]; (4) the onset in most cases is sudden, with severe vomiting and diarrhoea. The majority of cases were in poor Bengalees living in damp, dark and insanitary one-storied buildings in badly drained areas. All the epidemics in Calcutta have occurred after the rains when fruits and green vegetables are abundant and there is presumably no lack of vitamin B.

ii. The "present epidemic" is inferred to be the same as that noted above, which these authors also distinguish from beriberi. It affected Bengalis, both Hindus and Mahomedans and native Christians, at all periods of life. Most were poor labourers living in low-lying, dark, poorly-ventilated, damp, overcrowded rooms. One-third were attending hospital for some other disease at the time of onset. Almost all were rice-eaters and 350 got their supplies daily from the grocer, i.e., they did not store rice. As evidence of the inadequacy of the deficiency hypothesis the names are given of five previously healthy persons living on a mixed diet. The initial complaint was diarrhoea, epigastric discomfort and swelling over the ankles or tibiae, 102 cases showed profound cardiac symptoms, such as orthopnoea; there is no indication of the fate of these, but in two "the death was sudden."

A. G. B.

- ACTON (Hugh W.) & CHOPRA (R. N.). **Further Investigations into the Aetiology of Epidemic Dropsy.**—*Indian Med. Gaz.* 1927. July. Vol. 62. No. 7. pp. 359-362. With 1 plate. [2 refs.] [Calcutta School of Trop. Med.]

The authors refer to their 1925 paper [see this *Bulletin*, Vol. 22, p. 582] in which they attributed the clinical phases of epidemic dropsy and beriberi respectively to differences in the amounts of the neurotoxic and water-soluble bases that result from the decomposition of rice, the

former causing neuritis and the latter dropsy. They now go into the causation of the diarrhoea and fever of epidemic dropsy. In 1926 they investigated a large epidemic that occurred in August to November. This disease in Calcutta is not related to avitaminosis, for then it should be associated with famine conditions, but to the monsoon. A table gives the death rates from "beriberi" in Calcutta from March to the end of the year and weekly from August onwards. Deaths begin to occur in July, rise rapidly in August and remain high in September, October and November. The authors correlate these rates with a fall of $1\frac{1}{2}$ inches of rain on May 18 and very heavy rain (1.2, 5.2, 5.1 inches) which occurred on July 20th-22nd. The first fall caught a large amount of rice in transport to Howrah and Kidderpore and it was those two areas of Calcutta that were the first to be affected. The second rains flooded the whole town, and must have caused much damage to stored rice. The authors write: "In roughly from two to four weeks after the flood the damaged rice reached the market, and about six weeks later the death rate began to increase, as it takes from two to two-and-a-half months for the consumption of the diseased rice to show its influence on the deathrate."

Routine cultures were made from the blood, urine and faeces of patients. The blood cultures [number not stated] were "invariably negative." Catheter specimens of urine were examined from 20 cases and from 9 were grown gut streptococci of *faecalis*, *mitis* or *salivarius* type, and bacilli of intestinal type. It was concluded that as the result of the intestinal irritation by toxins faecal streptococci and bacilli passed into the bloodstream and were excreted by the kidney, the fever being attributable to their destruction in the blood. The bacilluria is compared to that which is seen after the enteric fevers.

Examination of the stools of patients and controls by smear showed that the bacilli present in the former were nearly all gram-positive, while in the controls the majority were gram-negative. It was found that the rice bacillus would not grow on McConkey plates owing to the presence of bile salts, so the stools were cultivated on ordinary agar. Of 20 cases so examined the rice bacillus was grown in six. "These facts show that the organisms can live in the gut above the papilla of Vater." The gram-positive bacilli were very similar in appearance to the young forms of the rice bacillus. The authors think that actively multiplying forms in the diseased rice may be implanted in the gut and passed in the stool; such an occurrence might account for cases of personal infection. A report is given of an autopsy with microphotographs.

The conclusions are as follows:—

"(1) There is a close association between epidemic dropsy and the wetting of rice by sudden storms or flooding which allows decomposition to start in the rice, and then produces these poisonous bases.

"(2) The excessive humidity that occurs during the monsoon months is also dangerous when rice is stored in stacks and in ill-ventilated godowns.

"(3) The diarrhoea that is produced is due to the action of these water-soluble bases causing oedema of the mucous membrane and exfoliation of the epithelium.

"(4) The damaged mucous membrane now allows the intestinal cocci and bacilli to invade the blood stream and thus produce the fever.

"(5) These organisms can be found in the urine by suitable methods of culture.

"(6) The stools in the acute stage of the disease show large numbers of Gram-positive organisms.

"(7) The rice bacillus can be cultivated from the stools of these cases, provided the medium contains no bile salts.

"(8) It is possible that infections may occur of the stomach and duodenum by these organisms, and under rare conditions the disease may be spread from person to person when contact is intimate."

A. G. B.

SARCAR (Sarasi Lal) & GUPTA (Brajendra Mohon). **Epidemic Dropsy at Sandwip.**—*Indian Med. Gaz.* 1927. May. Vol. 62. No. 5. pp. 254-256.

Sandwip is an island off the mouth of the Ganges, where the authors were sent to investigate an outbreak of epidemic dropsy. Thirty-five persons were found to be affected, 31 of whom belonged to five families, and of these only three escaped the disease, two of whom were aged 2 and 3 years and lived on milk. The attacks were mild and all recovered. The island is fertile, milk is cheap and vegetables may be obtained in abundance. Sufficient rice is produced for local consumption and no rice mill exists. The outbreak occurred just after a period of heavy rainfall, 17 inches in a week. Details are given of the methods of storage of rice—usually in tin sheds with defective floor and roof. The inmates of all the houses, but one, affected used rice imported from Barisal or Rangoon, and those who used such rice but were unaffected did not store it but bought it in small quantities. The inhabitants in general used coarse local rice. The authors seem to assume that the rice contained an infective agent, noting that epidemic dropsy was raging at Barisal. A table gives data of the outbreak and a synopsis of the symptoms.

A. G. B.

ANDERSON (I. R.). **An Apparently Infectious Outbreak of the Epidemic Dropsy Form of Beriberi.**—*Indian Med. Gaz.* 1927. Feb. Vol. 62. No. 2. pp. 71-75. With 1 text fig.

The author describes a small outbreak of epidemic dropsy (18 cases) among the Mission workers of Kalna, Bengal, after the reception of a man and his wife who were suffering from the disease. The cases appeared to be directly traceable to the infected family. These cases were less severe than the original, except for one in a girl of 18, who is said to have died from beriberi (the distinction between the two conditions is very uncertain). The outbreak was strictly limited to the Mission compound, and did not affect the native town of Kalna. It was, however, present in a village 16 miles off. The rice used was the same as that supplied to the town; all the 9 households infected obtained their supply from the same shop, but enquiry showed no general affection of others from that source. The author thinks that the disease was due not to rice, but to personal infection. He admits that really few of those who came into contact with the patients contracted the disease.

P. W. Bassett-Smith.

SAGAYAM (A. Deva). **An Epidemic of Dropsy among Indians in Fiji.**—*Indian Med. Gaz.* 1927. Sept. Vol. 62. No. 9. pp. 506-507.

In February 1927, dropsy began to appear among the Indians of Fiji and soon was reported from all parts of the Colony. No indication is

given of the numbers affected. The attack started with fever, rising to 101° and subsiding after a few days. Gastro-intestinal symptoms were always present with diarrhoea in the early stages. Oedema of legs and feet was constant; in a few cases it affected face and body also. It was "firm to the touch, warm on the skin surface" with "a reddish flush," and was slight in the mornings. Peculiar cauliflower-like haemorrhagic growths appeared in many parts of the body (sometimes in 10 sites on one patient), varying in size from a pea to a walnut and bleeding profusely. Some disappeared after a few days; others required ligature. Anaemia was usually present, especially in the later stage. There was no pain in the calves on pressure, no albuminuria, no absence of patella reflex; heart signs were rare. The symptoms lasted as a rule six to eight weeks. The mortality was low, "the fatal cases usually showing general anasarca towards the end."

The disease was seen among Indians only and was attributed to some article of diet. At first rice was suspected, but the Chinese and Fijians who shared the imported rice with the Indians were not attacked. The author—and in this he is supported by Dr. HARPER, Acting Chief Medical Officer—attributes the outbreak to mustard oil. It appears from a letter from Dr. HARPER that at Suva jail two cooks were attacked in succession, then the gardener, who was a member of the cooks' mess, then the two relieving cooks, but no one else. Now the only persons who received extras in this jail were the members of the cooks' mess who received a double portion of mustard oil and of curry powder five-fold. The curry powder elsewhere proved harmless, so that the mustard oil is incriminated. Its issue was stopped and no more cases occurred. [The evidence incriminating the mustard oil does not quite satisfy.] The author asks whether the disease is identical with the epidemic dropsy of India, whether haemorrhagic growths have been noticed elsewhere and whether any article other than rice has been incriminated.

The Editor adds a note. He presumes that the cooks received an extra ration of rice also, and thinks that this may have been infected rice from Calcutta. He says that the association of sarcoids (bleeding capillary naevi) with the Calcutta epidemic of 1926 was especially noticeable.

A. G. B.

RAY (Charubrata). **Epidemic Dropsy: its Blood Picture, General and Biochemical.**—*Indian Jl. Med. Res.* 1927. July. Vol. 15. No. 1. pp. 67-79. [7 refs.] [Calcutta Med. College.]

This disease is somewhat similar to beriberi. There is a marked drop in red but an increase in white corpuscles, especially in eosinophiles. Coagulation time is about normal. The total nitrogen (especially of protein) is low—urea and creatinine are not affected, but uric acid is high, chlorides are increased, and calcium is usually high also. Cholesterol was not far from normal and pseudo-globulin was much increased; in some cases there was 3 times the amount of this protein as compared with albumin.

W. D. Halliburton.

PELLAGRA.

GOLDBERGER (Joseph) & SYDENSTRICKER (Edgar). **Pellagra in the Mississippi Flood Area. Report of an Inquiry relating to the Prevalence of Pellagra in the Area affected by the Overflow of the Mississippi and its Tributaries in Tennessee, Arkansas, Mississippi, and Louisiana in the Spring of 1927.**—*Public Health Rep.* 1927. Nov. 4. Vol. 42. No. 44. pp. 2706-2725.

This report deals with the prevalence of pellagra and the conditions responsible for it in the Mississippi flood area. Exact figures of pellagra prevalence were very hard to obtain since at the best of times only one of the four states visited (Mississippi) had anything like morbidity records of this disease and, owing to the disorganization following the flood, even these were very incomplete. As a result of meetings with local physicians, public health authorities etc., the authors were satisfied that the incidence of pellagra in the localities visited (Tennessee, Arkansas and Mississippi) was abnormally high. A house to house canvass was made in the neighbourhood of Indianola between June 20th and July 22nd, 1927, covering an unselected population of 4,179. Among these 102 pellagra cases were recorded, an incidence of approximately 22.4 per 1,000. The authors estimate that in the three areas (Tennessee, Arkansas and Mississippi) the rate is about 10-20 per 1,000 of the rural population.

Another method of investigating the question is to estimate the probable pellagra morbidity in the four states, Tennessee, Arkansas, Mississippi and Louisiana, on the bases of previously recorded deaths. The death rate has increased considerably in these states during the last three years. With this regular increase it can be assumed that the death rate will in 1927 be at least one-quarter to one-third larger than that of 1926. Therefore in 1927, 2,300-2,500 deaths may be expected to occur. Now it has been found that the fatality rate does not exceed 5 per cent. of the total cases. therefore 45,000-50,000 individuals will have suffered a recognizable pellagra attack in these four states during 1927. Probably half of this number will be in the overflow area.

It is impossible to deal adequately with the various economic factors associated with pellagra prevalence. Suffice it to say that "The prevalence of pellagra at any given time in the lower Mississippi River area is involved in three sets of conditions, namely: (a) The dietary habits of the inhabitants. (b) The tenant farm system of cotton production, cotton being the chief crop throughout the lowlands along the Mississippi and tributary rivers. (c) The availability of supplies of various foods which, in turn, is influenced by the one-crop type of agriculture, with the consequent lack of diversification, and by the dietary habits of the people."

It must not be forgotten that the unprofitable cotton crops of 1925 and 1926 had already increased the pellagra rate irrespective of the flood.

The following recommendation is suggested by the authors for the relief of the stricken population in respect of pellagra:

"The appropriate local relief agency or agencies furnish the local health officer with a supply of such non-perishable supplemental "P-P" rich foods as dried pure yeast (preferably the killed culture), canned (chum) salmon, canned beef and canned tomatoes, or adequate funds or credit with which

to purchase such a supply, which he may then distribute on physicians' requisition or otherwise to those in need who are actually sick or present evidence of an impending attack of the disease. Since the vast majority of patients are able to be up, the question of hospitalization will arise only in a relatively small minority. In general, patients properly fed will regain their health and normal vigour in from six to twelve weeks. In the foregoing it is assumed that the patient has a sufficient supply of the basic staple foods."

A. D. Bigland.

KLAUDER (Joseph V.) & WINKELMAN (N. W.). **Pellagra among Chronic Alcoholic Addicts. A Clinical and Laboratory Study.**—*Jl. Amer. Med. Assoc.* 1928. Feb. 4. Vol. 90. No. 5. pp. 364-371. With 14 text figs. [35 refs.] [Philadelphia General Hosp., Lab. of Neuropath. & Res. Inst. of Cutaneous Med., Philadelphia.]

A study is here presented of one hundred patients at the Philadelphia General Hospital who showed pellagra skin appearances. With few exceptions the patients were chronic alcoholics; 71 were males and 29 females. The ages ranged from 25 to 79 and most were Irish Americans.

The history common to nearly all of the patients was chronic alcoholism followed by a debauch lasting weeks or even months, during which practically no food was taken. Not all showed signs of pellagra on admission.

For conveniences of description the cases were divided into three groups: *Group 1* includes only mild cases with dermatitis on the hands as practically the sole sign. Such patients were only discovered on systematic search. *Group 2*; in these cases the skin lesions were more marked and more widely spread. Soreness of the tongue and diarrhoea were constant. *Group 3* included all the very serious and acute cases, so called typhoid pellagra, etc. There was a high mortality in this group. Apparently mental symptoms were common to all three groups and were the cause of the patient's admission to hospital.

A very careful description of the skin lesions is given, accompanied by a series of beautiful photographs.

The association between alcoholism and pellagra has long been recognized, mention of it being made in the original reports of CASAL in 1762. Many other references are given from which it appears that the rôle played by alcohol in this disease is widely admitted. An allied condition, chichism, is reported from Colombia, resulting from the abuse of a cheap native maize spirit called chicha. In short, chronic alcoholic patients are potential pellagrins.

In a discussion on pseudo-pellagra the authors register their disapproval of the term, especially as applied to the alcoholic type. In their opinion the term pseudo-pellagra or pellagroid should be used for the condition following large doses of sulphomethane, in which a pellagra-like rash occurs and is associated with diarrhoea. Mention is made of other diseases such as ergotism, lathyrism and acrodynia, which may present pellagra-like symptoms.

An attempt to induce pellagra in a monkey injected with the blood and spinal fluid of pellagrins supplemented by a minimum diet and the ingestion of alcohol, proved a failure.

In the section dealing with the neuropathology of the disease the authors discuss the importance of the so-called central neuritis of Adolph MYERS. This condition is similar to that described by NISSL

(1890) in the cells of the fifth cranial nerve nucleus after avulsion of the trigeminal nerve. The chief changes are swelling of the cell, disappearance of Nissl bodies and eccentricity of the nucleus. This change was found in the cells of the cerebral cortex in every one of the eleven pellagra cases examined and very often, too, in alcoholism, especially delirium tremens. Another name for central neuritis is retrograde degeneration. In short, pellagra causes: (1) retrograde cell changes in cortex and spinal cord; (2) increased lipoid content throughout the entire central nervous system; and (3) thickening and hyalinization of small vessels in the brain and cord. In uncomplicated alcoholism the last two findings are absent.

A. D. B.

ALBERTONI (Pietro) & TULLIO (Pietro). Alimentazione e pellagra Osservazioni critiche e ricerche sperimentale sopra l'eziologia e la cura della pellagra. [*Diet and Pellagra. Critical Observation and Research on the Causation and Treatment of Pellagra.*].—*Polislinico. Sez. Med.* 1927. Oct. 1. Vol. 34. No. 10. pp. 493-516. [22 refs.]

This paper is mainly a general discussion of the various views which have been brought forward during the last quarter of a century on the question of pellagra and diet. The authors have analysed maize and other foods and estimated the intake and output of carbon, nitrogen, and phosphorus; also the effects on the body-weight, the dynamometer readings and the blood-estimations during the time that various diets were being taken. They conclude that pellagra is typically a deficiency disease, from the inadequacy of maize as a diet, this article loading the body with carbon while depriving it of nitrogen. Though they are convinced that these are the main facts, they state that the actual substances which are deficient are still undecided.

H. Harold Scott.

MOLLO (W.) & KLEIN (B.). Beiträge zur Klinik der Pellagra. [*Clinical Features of Pellagra.*].—*Abhandl. a. d. Gebiet d. Auslandskunde. Hamburg. Univ.* 1927. Vol. 26. (D., Med. & Vet. Vol. 2.) [Festschrift NOCHT.] pp. 349-356. [9 refs.] [Intern. Clinic, Univ. Sofia.]

This paper is divided into two separate sections, the first part dealing with gastric chemistry in pellagra.

LOMBROSO was the first observer to note gastric symptoms in pellagra, viz. pyrosis, flatulence and anorexia. These symptoms were extremely common, being absent only in six out of all his cases. LOMBROSO was apparently the first worker to notice achlorhydria in this disease.

Other work dealing with gastric symptomatology in pellagra is quoted and the authors stress, from their own observations, the early appearance of the typical glossitis.

Investigations of the stomach contents were made using the fractiona method. In those cases where achlorhydria was found, a further test was made by injecting histamine and again examining the gastric contents. It was found that 77 per cent. showed achlorhydria, 11.5 per cent. "anaciditas," i.e., acid production provoked by histamine, and 11.5 per cent. were normal. The results obtained from the examination of 26 cases are embodied in a table.

The second part of the paper deals with the blood picture in pellagra. After reviewing a small section of the literature the authors describe their own findings, which do not differ markedly from the normal. An interesting case is given of an old pellagrin, who had suffered from the disease for twenty-eight years with a recurring rash each spring, and whose blood picture was found to be that of a typical pernicious anaemia. The authors lay stress upon the numerous similarities between these two conditions.

A. D. B.

KIMBER (W. J. T.). **A Case of Pellagra with Recurring Attacks.**—*Jl. Mental Sci.* 1927. July. Vol. 73. No. 302. pp. 433-439. [10 refs.]

After recapitulating the various theories of pellagra etiology the author gives a very full account of a case which was under observation for a period of five years.

The following are the details of the case :—

Female aged 30. Admitted to hospital (apparently Hill End Mental Hospital, St. Albans) March 29th, 1921. Death took place in November, 1926.

The patient was suffering from primary dementia, having been mentally unstable for five years prior to admission. In September, 1921, pellagrous rash appeared, preceded by diarrhoea. In 1922 and 1923 no skin manifestations were noted, but in March, 1924, they reappeared. The diet was then increased by one egg and one pint of milk. In August, 1925, pellagra again appeared without tongue signs or diarrhoea. In the following August, 1926, there was a recurrence associated with typical tongue appearances and diarrhoea. By September the rash had almost vanished but there was a recrudescence in October. One drachm of yeast three times a day was given. Later she developed choreiform spasms and she died suddenly after a convulsive attack involving the face and upper limbs.

Very full post-mortem findings are described, including histology of various organs. These differ in no essential respect from those met with in other cases and therefore do not call for special mention. It is interesting to note that the Betz cells of the cortex showed almost certain central neuritis.

The author comments upon the findings in this case and concludes with a question, "Assuming that vitamin B deficiency is the causative factor, then under what conditions does beriberi occur and what modifications of these conditions produce pellagra?"

A. D. B.

WHITE (E. Barton) & HADFIELD (Geoffrey). **A Case of Pellagra.**—*Jl. Mental Sci.* 1927. July. Vol. 73. No. 302. pp. 430-433. With 1 plate.

The patient, a married woman aged 28, was admitted to hospital (apparently the Bristol Mental Hospital) in April, 1925. She had been growing pale, thin and irritable for several months.

Condition on admission.—The patient was wasted and the urine showed a trace of sugar. Mentally she was in a state of confusion with ideational inertia. A diagnosis of confusional insanity of the depressed form was made. In two months she was sufficiently improved to be nursed on the verandah. While here she became acutely sunburned, and this was followed by a pellagrous eruption on the face, neck and hands, which later became septic. Intermittent diarrhoea was present and the tongue was swollen, red and ulcerated in one marginal area.

Progress of the Case.—The patient continued to lose weight and the mental condition remained unchanged. The skin condition improved in the autumn and by December it showed dry pigmented thickening in the regions affected. Except for the disappearance of the glycosuria and the appearance of albuminuria, laboratory investigations revealed no interesting changes. In spite of a diet of raw eggs and milk, beef tea, milk pudding and custard together with orange juice and an arsenic and nuxvomica mixture, the patient continued to lose weight and in February 1926 there was extreme emaciation and established diarrhoea. The pigmented skin patches became again the site of sepsis and she died early in March of septic absorption.

Post Mortem Examination.—Absence of abdominal fat. Spleen enlarged, red and diffuent. Heart and lungs healthy. Thinning of the mucous membrane lining the whole alimentary tract, but no ulceration. No naked eye abnormality of the nervous system or endocrine organs. (Some of the latter were examined microscopically). In the first two segments of the cervical cord examined the Weigert-Pal method showed considerable marginal and pseudo-systematized demyelination (well shown in the microphotograph accompanying the paper).

The atrophy of the small bowel was apparently in respect of the lymphoid elements. Unfortunately post-mortem changes prevented full investigation of this point, but subsequent work on another case confirmed the finding.

The skin showed extensive surface keratinization with underlying acute inflammatory changes.

A. D. B.

MU JUI-WU. **Pellagra as observed in China: with a Report on One Case in Peking.**—*Nat. Med. J. China*. 1927. June. Vol. 13. No. 3. pp. 229-242. With 6 text figs. [30 refs.] [Peking Union Med. Coll., Peking.]

There are no data to show how long pellagra has existed in China. The first case was reported in 1919 and since then a few more have been described by TYAN and by WU. The author adds one more case the details of which are very full.

Male aged 31, soldier. Observed in Peking Union Medical College Hospital April 12th-June 8th, 1926. He was admitted complaining of a creeping sensation over the whole body of three months' duration and roughness of the skin on the backs of the hands and neck for the last month.

The patient had been a soldier for the last ten years. During the last year he had been stationed at Peking. At first the diet contained rice, cabbage, bean-curd, bean-sprouts, spinach and turnips. This diet was changed about seven months prior to admission to hospital. In the first two months millet was the only cereal eaten; later maize was substituted. For the last seven months the vegetables had consisted only of turnips, cabbage and spinach. Ninety other soldiers under exactly the same conditions had remained free from pellagra. The creeping sensations were so intense that he made more than one attempt at suicide. There were no alimentary symptoms.

On admission he was fairly well nourished and appeared depressed. The hands, forearms and neck showed the pellagra eruption (vide photographs); there was seborrhoea of the face and a very glossy tongue without ulceration. Very elaborate laboratory investigations were made, the most interesting results of which are—ova of ankylostoma in the faeces, achlorhydria, and a high spinal fluid sugar content (111 mgm. per cent.) and protein content.

At first for investigation purposes the patient was kept on his pre-admission diet. The skin of the abdomen was found to be markedly sensitive to artificial sunlight as seen in particularly clear photographs. On April 4th he developed tinnitus and at the same time a rash on the calves.

On April 26th a high protein diet was substituted (approximately 3,000 calories per day). Four days later dilute HCL was given. After about a week the skin lesions had practically cleared, and the patient felt much better. On May 13th the skin sensitiveness to light had markedly decreased. Yeast powder (3 gm. t.d.s.) was tried later, but resulted in no further improvement.

The author discusses the findings in this case and compares them with the observations of others. It is very puzzling why pellagra is so apparently rare in China, where a large majority of the population live on an extremely restricted diet.

A. D. B.

MACCARTHY (James T.). **Familial Pellagra in Ireland.**—*Brit. Med. J.* 1927. Dec. 24. p. 1180.

The two cases of pellagra here recorded are of interest in that the disease is rare in Ireland and both occurred in one family.

Case 1. Female, married. Seen first in May, 1926. She then complained of weakness and loss of energy. There was marked seborrhoea about the nose and a dermatitis on the hands and forearms. Constipation was present. Seen again June, she had diarrhoea and vulvitis and later in the month she presented all the appearances of an acute pellagra including marked glossitis. She died of exhaustion on June 28th, 1926.

There is the possibility that this was an exacerbation of a chronic condition the patient "having had to go to bed years ago because of a rash about the neck."

The diet was usual for her class and country i.e., "bread, butter and an egg in the morning, potatoes, meat and vegetables (usually cabbage) for dinner, and tea, and cocoa at bed time."

Case 2. Female, married, aged 33 (sister of above). First seen on July 28th, 1926. Miscarriage in October, 1925, since when she had felt weak. Salivation and loss of weight complained of, but there was no diarrhoea. She presented dermatitis of the hands and said that she had this every summer and on the neck also. She recovered on tonic treatment.

The Registrar-General of the Free State informed the author that two deaths from pellagra had been registered in 1922 and 1923, both in females aged 55 and 60 respectively.

A. D. B.

GOLDBERGER (Joseph) & WHEELER (G. A.). **A Study of the Pellagra-Preventive Action of the Cowpea (*Vigna sinensis*) and of Commercial Wheat Germ.**—*Public Health Rep.* 1927. Sept. 30. Vol. 42. No. 39. pp. 2383-2391. [5 refs.]

The author summarizes his paper as follows:—

"1. The pellagra-preventive action of the cowpea (*Vigna sinensis*) and of commercial wheat germ have been studied.

"2. The pellagra-preventive factor (P-P) is present in the cowpea (and probably in the soy bean) but in relatively small amounts.

"3. The pellagra-preventive factor (P-P) is present in commercial wheat germ.

"4. Commercial wheat germ is probably somewhat richer in factor P-P than is the cowpea.

"5. It would be advantageous to include in the dietary, particularly of those in the area of pellagra endemicity, milling products of wheat containing as high a percentage as practicable of the germ and the bran.

"6. Added strength is furnished for the view that foods known to contain the so-called vitamin B contain the P-P factor.

"7. The experience with wheat germ constitutes evidence of the soundness of the hypothesis that black tongue of dogs is the analogue of pellagra in man."

A. D. B.

GOLDBERGER (Joseph) & WHEELER (G. A.). **Experimental Black Tongue of Dogs and its Relation to Pellagra.**—*Public Health Rep.* 1928. Jan. 27. Vol. 43. No. 4. pp. 172-217. [8 refs.] [Summary appears also in *Bulletin of Hygiene.*]

A pathological condition in dogs has been produced experimentally by feeding them upon: (1) a diet known to cause spontaneous pellagra in man; and (2) upon a diet which experimentally has given rise to pellagra in man.

This canine experimental condition has been carefully observed. It commences with a stomatitis followed by necrosis and presents features in no way distinguishable from the disease known as Black Tongue, which occurs naturally in dogs. The post-mortem findings, too, present the same similarity and the authors are of the opinion that the two conditions are in fact identical.

Some of the dogs in addition to black tongue developed an eruption on the scrotum very similar to the dermatitis met with in pellagra. Arguments are produced to show that not only are spontaneous and experimentally produced black tongue in dogs one and the same condition, but that they have a common etiology with human pellagra.

A. D. B.

BALLIF (L.) & GHERSCOVICI (I.). La réserve alcaline et la calcémie dans la pellagre. [**The Alkaline Reserve and Blood Calcium in Pellagra.**—*C.R. Soc. Biol.* 1928. Feb. 10. Vol. 98. No. 5. pp. 393-395. [2 refs.] [Summary appears also in *Bulletin of Hygiene.*]

The normal alkaline reserve of the blood is 65 cc. of CO₂ per 100 cc. of plasma, the maximum being 77 and the minimum 53. Out of 80 serious cases of pellagra, 47 showed an alkaline reserve below 65, 22 below 50 and 5 below 40, while in 6 cases only the alkaline reserve was above 65. The decreased alkaline reserve is accompanied by an increased acidity of the urine. These results were obtained in the spring and summer. During the colder months the general condition of the patients improves and the alkaline reserve returns to normal. The acidosis during the warmer months is ascribed to an acute inflammation of the intestine and abnormal elimination of alkali by profuse diarrhoea. Administration of 10 gm. of sodium bicarbonate in acute cases had no effect on the alkaline reserve or on the acidity of the urine. When the alkaline reserve was below 45 and not modified by sodium bicarbonate, patients usually died. In 10 cases of pellagra examined, the blood calcium was in each case abnormally high (01.5 to 13.5 mgm. per 100 cc.)

Douglas C. Harrison.

HELMINTHIASIS.

JOYEUX (Ch.). La prophylaxie des helminthiases. [**Prevention of Helminthiases.**—*Rev. d' Hyg. et de Méd. Préventive.* 1927. July. Vol. 49. No. 7. pp. 499-515.]

The author disclaims any intention in the present article of writing an original scientific memoir. He has, however, presented recent knowledge from a point of view which is unusual if not original. The exposition is based not upon the zoological grouping of the parasites, but according to the manner in which the host contracts the infection. His chief headings are as follows:—

I. Helminthiasis acquired by ingestion of :

(1) butcher meat ; (2) fish ; (3) crustacea ; (4) water : (a) containing microscopic crustacea ; (b) as drinking water, or of food and vegetables which have been in contact with water ; (5) accidental ingestion of insects.

II. Helminthiasis contracted by cutaneous penetration :

- (1) Larvae living in earth.
- (2) Larvae living in water.
- (3) Larvae transmitted by insects.

In this fashion the author provides a remarkably clear and informative review of recent advances in medical helminthology.

R. T. Leiper.

KHALIL (M.). **Some Factors influencing the Spread of Ankylostomiasis and Bilharziasis in Egypt.**—*Abhandl. a. d. Gebiet d. Auslandskunde. Hamburg. Univ.* 1927. Vol. 26. (D., Med. & Vet. Vol. 2.) [*Festschrift NOCHT.*] pp. 232-235. With 2 figs. (1 map) on 1 plate.

Khalil considers in turn the importance of : (a) temperature, (b) rainfall ; (c) irrigation ; and (d) subsoil water, in relation to the spread of the two most important infestations of Egypt. *Ancylostoma duodenale* appears to be considerably affected by the variation of temperature, for the incidence of infection increases distinctly towards the north from Cairo, but this is the case also with the density of population. The development of the bilharzia worms in their molluscan intermediate hosts is also affected by temperature. A graph shows the weekly output of cercariae from planorbis throughout the year 1923. In Egypt rainfall is so scanty as to be a negligible factor. Artificial irrigation, owing to the number of small canals and drains which provide for the multiplication of molluscs, plays a great rôle in the spread of bilharzia. Of the two Egyptian species of bilharzia *S. mansoni* is limited in distribution to Lower Egypt, north of Cairo, whereas *S. haematobium* occurs throughout Upper, Middle and Lower Egypt. The rise during recent years in the level of the subsoil water is thought to have favoured the spread of ankylostomiasis, and to have acted indirectly in enhancing the incidence of bilharziasis by preventing the rapid drying of the canals when they are empty.

R. T. L.

DE RIVAS (Damaso). **An Efficient and Rapid Method of Concentration for the Detection of Ova and Cysts of Intestinal Parasites.**—*Amer. Jl. Trop. Med.* 1928. Jan. Vol. 8. No. 1. pp. 63-72. With 3 text figs. [2 refs.] [Dept. of Med. Zool. & Trop. Diseases, Univ. of Pennsylvania, Philadelphia.]

Rivas claims that the following technique is efficient, practical and rapid for the examination of any desired amount of faeces. By previously weighing the specimens the number of eggs and cysts per gram of material can also be determined. One or more grams of faeces are placed in a large or medium sized tube to which an excess of a 5 per cent. solution of acetic acid is added at the rate of about 5 cc. for each gram of material. The mixture is forcibly shaken for about half a minute or so until a more or less homogeneous suspension is obtained. The suspension is allowed to stand for about one half to one minute. The supernatant homogeneous suspension may then be removed by a pipette or filtered with a double layer of cheese cloth or a piece of fine copper wire gauze. To 5 cc. of the filtrate or suspension in a centrifuge tube add an equal quantity of ether. The mixture is forcibly shaken for a few seconds by a rapid motion of the wrist. The mixture is then centrifuged for a few minutes, during which time it separates into four layers with the ethereal extract on top, next the detritus, then the acetic acid and finally at the bottom is the sediment, which may be very scanty. This sediment is pipetted off and examined as a fresh coverglass micro-preparation.

The method can be used also for the detection of "occult" blood and the approximate determination of bile in the faeces. A table is given showing the relative number of ova, protozoal cysts and other bodies found in a single drop of material collected by the concentration methods of TELEMAN, BASS and RIVAS. [No reference is made to Clayton LANE's method or studies in controls.]

R. T. L.

NEVEU-LEMAIRE. Essai de mammalogie médicale. II. Les mammifères hôtes intermédiaires ou hôtes définitifs des helminthes parasites de l'homme et ceux qui hébergent des parasites qui leur sont communs avec l'espèce humaine. [**Mammalian Hosts of Helminths Parasitic in Man.**]—*Ann. Parasit. Humaine et Comparée.* 1927. Oct. 1. Vol. 5. No. 4. pp. 356-380; 1928. Jan. 1. Vol. 6. No. 1. pp. 107-131. [26 refs.] [Lab. Parasit., Faculty of Med., Paris.]

Neveu-Lemaire continues his article (see this *Bulletin*, Vol. 24, p. 863), on the rôle of mammals as reservoirs and intermediate hosts. The parasites are listed under the hosts, which are arranged systematically. [It is impossible to offer a summary of the details given.]

R. T. L.

BLIGH-PEACOCK (N.). **The Prevalence of Intestinal Worms and the Amount of Illness produced thereby amongst the Banyankole.**—*Uganda Protectorate Ann. Med. & San. Rep. for the Year ended 31st December, 1926.* Appendix No. VII. pp. 93-95.

A somewhat unusual method of diagnosis has been employed by the author in a series of 1,081 consecutive cases of sick persons to discover illness due to intestinal worm infections. A dish containing specimens

of ascaris and tapeworms was exhibited to the patients who were asked to state whether they had seen these objects in their faeces. The diagnosis made by this method was checked by a consideration of the signs of illness and by the results of treatment and are stated to have indicated massive infections with a fair degree of accuracy. At Mbarara and Masaka hospitals a number of deaths have occurred from ascaris infection. No clinical indication of hookworm disease was obtained.

R. T. L.

PHILIP (C. R.). **A Note on Helminthic Infections among Some Coast Natives.**—*Kenya & East African Med. Jl.* 1927. Oct. Vol. 4. No. 7. pp. 207–210.

At Kwale there were 34 prisoners. The faeces of each were examined on three separate occasions. Thirty-two (or 94 per cent.) were found to harbour hookworms. There were 4 cases with *Ascaris*, 5 with *Trichuris*, 3 with *Strongyloides*, 1 with *Taenia saginata* and there was a single case of *Schistosoma haematobium*. The incidence of multiple infestations is indicated in tabular form.

R. T. L.

MORVAN, VOIZARD (F.) & BAIZE. Le parasitisme intestinal des Malgaches (parasitologie, hématologie). [**Intestinal Parasites of Malagasies.**]—*Bull. Soc. Path. Exot.* 1928. Jan. 11. Vol. 21. No. 1. pp. 20–25.

From an examination of the stools of 1,500 Malagasy soldiers the authors observe that almost 85 per cent. are infected with parasites on arriving in France from Madagascar, and that the degree of parasitism drops after a prolonged stay in France. This is doubtless due to the relatively higher standard of hygienic practice during their sojourn there.

R. T. L.

MUKERJI (A. K.). **The Incidence of Helminthic Infections in the Carmichael Hospital for Tropical Diseases, Calcutta.**—*Indian Med. Gaz.* 1927. Dec. Vol. 62. No. 12. pp. 695–696. [1 ref.]

Mukerji tabulates the results of a routine examination of the stools of every patient admitted to the Carmichael Hospital, and the Medical College Hospital, Calcutta, during the year 1925–26. In addition to the commoner parasites of man it is noteworthy that of a total number of 1,524 examined, there were 6 cases of *Trichostrongylus* infection, 2 of *Heterodera radiculicola*, 1 *Fasciolopsis buski* and 1 *Bertiella satyri*.

R. T. L.

DE MELLO (Froilano). Parasites intestinaux de l'Inde portugaise. [**Intestinal Parasites of Portuguese India.**]—*Bull. Soc. Path. Exot.* 1927. July 13. Vol. 20. No. 7. pp. 608–609. [School of Med., Nova Goa.]

During 1925–1926 there were examined in the Bacteriological Laboratory of the School of Medicine of New Goa, India, a total of 596 individuals. Of these 75 per cent. harboured ascaris; 48 per cent. whipworm; 32 per cent.

hookworm ; 7 per cent. *Strongyloides* ; 8 per cent. *Oxyuris* and 2 per cent. *Taenia solium* and *T. saginata*. Their distribution in the various departments of Goa are included in this brief note.

R. T. L.

SINELNIKOV (A. M.). Helminthofaunistische Untersuchung der Schüler von Aschchabad an der prophylactischen Ambulanz für Kinder. [Examination of Scholars of Askabad for Helminths.]—*Russian Jl. Trop. Med.* 1927. Vol. 5. No. 8. German summary p. 483. [In Russian pp. 480–482.]

Out of 492 school children in Askabad there were 75 cases of whipworm, 79 of *Hymenolepis nana*, 12 of *Taenia saginata*, 7 of *Ascaris lumbricoides*, 13 of *Oxyuris vermicularis* and 2 of *Ancylostoma duodenale*. *Oxyuris vermicularis* occurred in the appendix in 10 out of 28 cases operated upon for appendicitis.

R. T. L.

MORGAN (Julia). Intestinal Parasitism in Tsinan. As Observed in 1273 Routine Feces Examinations during a Period of 17 Months.—*China Med. Jl.* 1927. Oct. Vol. 41. No. 10. pp. 847–852.

1,273 faecal examinations were made during 17 months on 976 persons in the laboratories of the Shantung Christian University Hospital, from March 1st, 1925–July 31st, 1926. 62.9 per cent. were negative, 30 per cent. harboured ascaris, 1.1 hookworm, .7 whipworm, .6 tapeworm.

R. T. L.

TOYODA (Kazunaga). [Examination of 823 Spinning Factory Girls in the Muslim Spinnery at Nishinari, Osaka, for Intestinal Parasites.]—*Osaka Igakkwai Zasshi (Jl. of Osaka Med. Soc.)* 1927. Feb. Vol. 26. No. (1). [Summarized in *Japan Med. World.* 1927. Sept. 15. Vol. 7. No. 9. pp. 278–279.]

At Osaka of a total of 823 cases, 437 (53.09 per cent.) showed ascaris eggs, 401 (48.72 per cent.) whipworm and 79 (8.85 per cent.) hookworm.

R. T. L.

KARAPETIANE (E.). Contribution à l'étude des symptômes cliniques et du traitement de l'helminthiase. [Clinical Symptoms and Treatment of Helminthiasis.]—*Russian Jl. Trop. Med.* 1927. Vol. 5. No. 7. French summary p. 469. [In Russian pp. 439–445.]

Investigations on 100 cases at the Erivan Tropical Institute indicate that helminth infections are of great frequency in Armenia. The parasites noticed were *Taenia saginata*, *Hymenolepis nana*, *Oxyuris vermicularis*, *Trichostrongylus instabilis*, *Ascaris lumbricoides*, *Trichuris trichiura* and *Ancylostoma duodenale*. It is stated that helminth infections are almost always a source of nervous symptoms. The changes in the blood are leucopenia, lymphocytosis, presence of Rieder's lymphocytes, considerable increase in globulins, increased rapidity in coagulation. Occasionally anaemia was observed. Arterial tension and muscular activity were lowered. Those infected showed signs of myocarditis. It is recommended that large doses of extract of male fern should be avoided.

R. T. L.

CALDWELL (Fred C.). **The Parasitic Index of the School Children of Panama City.**—*Proc. Med. Assoc. Isthmian Canal Zone.* 1921-1926. Vol. 14. pp. 15-19.

When the Panama Canal was constructed the cities of Panama and Colon were provided with complete sewer systems and every building was supplied with flush closets. An examination of the children in the primary schools in Panama shows that 69.25 per cent. harbour some kind of parasite, 30.08 per cent. hookworms, 40.96 per cent. whipworm, 19.79 per cent. ascariis. *Taenia*, *Strongyloides* and *Oxyuris* fall below 1 per cent. each. Of 409 children found infected with hookworm 36.43 per cent. definitely stated that they had never been out of the city. These infections are due probably to overcrowding and improper use of toilets.

R. T. L.

DE LA BARRERA (J. M.) & RIVA (A.). *La Helminthosis intestinal de la población escolar de las provincias de Salta y Jujuy.* [**Intestinal Helminthiasis in School Children in the Argentine.**]—*Rev. Inst. Bacteriológ.* Buenos Aires. 1926. July. Vol. 4. No. 5. pp. 469-490. With 1 map. English summary p. 489.

The varying incidence of intestinal helminthiasis in children in schools in the provinces of Salta and Jujuy is not due to the different conditions of living or hygienic habits of the inhabitants, but to variations in geographical features of these regions. In certain isolated districts the degree of parasitism is high but generally speaking this is not the case. Attention is drawn to the occurrence of a very important focus of hookworm in the departments of Ledesma and San Pedro in the province of Jujuy.

R. T. L.

DE RIVAS (Damaso). **A Further Contribution on the Treatment of Parasitic and other Affections of the Intestine by the "Intra-Intestinal Thermal Method."**—*Amer. Jl. Trop. Med.* 1927. Nov. Vol. 7. No. 6. pp. 389-403. With 4 text figs. [2 refs.] [Dept. of Parasit., etc., Univ. of Pennsylvania, Philadelphia.]

The application, intra-intestinally, of saline solution at a temperature of 45° C. to 47° C. is an efficient and safe procedure for the rapid and complete removal of parasites inhabiting the large and small intestine of man. Observations on 500 new cases are recorded to support this claim made in an earlier paper (1926) [see this *Bulletin*, Vol. 23, p. 743].

The method requires careful technique and aseptic precautions. A brief outline of this treatment in a few illustrative cases is given.

R. T. L.

DIKMANS (G.). **Paradichlorobenzene as an Anthelmintic.**—*Jl. Agric. Res.* 1927. Oct. 1. Vol. 35. No. 7. pp. 645-649. [10 refs.]

SOLLMAN (1919) found that dogs tolerated paradichlorobenzene without ill-effects in doses up to 15 gm., but considered the drug to be of little efficacy as an anthelmintic. The author confirms this conclusion, especially in regard to hookworm from experiments on dogs.

R. T. L.

GUIMARAES (Féliciano). Sur le parasitotropisme de l'essence de *Chenopodium* pour les entozoaires. [**Parasitotropism of Oil of *Chenopodium*.**—*C.R. Soc. Biol.* 1927. May 13. Vol. 96. No. 15. pp. 1251-1253. With 2 text figs. [1 ref.]

Following a procedure analogous to that introduced by STRAUB, the author has obtained much better results in graphically demonstrating the toxic action of chenopodium by substituting for earthworms the *Ascaris lumbricoides* from pigs. Concentrations of 1 per 1,000 kill the parasites within 20 minutes. The contractions of fragments of *Ascaris lumbricoides* and of *Gigantorhynchus hirudinaceus* kept at a temperature of 38° in Bunge's fluid (i.e., a solution of 1 per cent. NaCl, and .1 per cent. Na₂CO₃), were graphically recorded. The graphic method indicates that the oil of chenopodium is the most toxic vermifuge for these worms.

R. T. L.

GUIMARAES (Féliciano). Action de l'essence de *Chenopodium* sur les vers de terre. [**Action of Oil of *Chenopodium* on Earth Worms.**—*C.R. Soc. Biol.* 1927. May 13. Vol. 96. No. 15. pp. 1249-1250.

This brief note indicates somewhat vaguely that earthworms are poisoned by various dilutions of chenopodium, santonin, thymol, etc., in various solvents. The author states that these studies have been commenced with a view to standardization.

R. T. L.

ACKERT (James E.) & OTTO (Gilbert F.). **Helminthiasis and the Thyroid Gland.**—*Amer. Jt. Trop. Med.* 1927. Sept. Vol. 7. No. 5. pp. 339-347. With 1 text fig. [10 refs.] [Agric. Experim. Sta., Kansas State Agric. College, Manhattan, Kansas]

Using the intestinal roundworm *Ascaridia lineata* of chickens, the authors have failed to find any significant change in the size of the thyroid glands or in their histology, and they have failed to confirm the suggestion of a relationship between helminthiasis and pathological thyroid glands which has recently been made.

R. T. L.

KENYA & EAST AFRICAN MEDICAL JOURNAL. 1927. Nov. Vol. 4. No. 8. pp. 256-259. **Simple Notes on Some Tropical Diseases. A Popular Account of the Commoner Diseases of East Africa, with Hints on General Lines of Treatment, for the Use of Those Out of Reach of Immediate Medical Assistance. III. Intestinal Worms.**

This is merely a popular account of intestinal worms of man in E. Africa with hints on general lines of treatment for those out of reach of immediate medical assistance.

R. T. L.

NICOLL (William). **A Reference List of the Trematode Parasites of Man and the Primates.**—*Parasitology.* 1927. Sept. Vol. 19. No. 3. pp. 338-351. [120 refs.] [Virol Path. Research Labs., London.]

Nicoll has already published several invaluable lists dealing with the trematode parasites of various groups of vertebrates, but this latest addition, on the same ground plan, is of more than usual interest to the student of tropical hygiene. The failure to realize that many of the

parasites which infest man may also be found in other mammals and that various mammals may harbour forms actually different from, but closely resembling those in man is held to be one of the chief reasons for the superfluity and confusing redundancy of synonyms in the nomenclature of certain parasites of man. It is noted that as far as the Trematodae are concerned there is not a particularly close correspondence between the parasites of man and those of other primates. Indeed many are more commonly associated with the cat and dog and with domesticated stock. The first recorded trematode in man (1790) was *Fasciola hepatica* named on that occasion by GMELIN as *F. humana*; a second early record (1803) was *Dicrocoelium lanceatum*. No further additions occurred for nearly fifty years when (1852) BILHARZ found the blood fluke named after him.

In the author's opinion two publications of the highest importance in systematic helminthology were published in 1926, viz., STILES' & HASSALL'S "Key Catalogue of the Worms reported for Man." and POCHÉ'S "System der Platyhelminthes." A most interesting dissection of certain of POCHÉ'S recent decisions and an entertaining and shrewd discussion of their implications follows. The appended list of parasites gives as far as possible all references to primary records and to the most accurate or comprehensive of subsequent descriptions.

R. T. L.

NAGANO (Kanji). **A Collecting Method of Metacercariae.**—*Okayama-Igakkai-Zasshi*: (Zent. d. Okayama Med. Gesellsch.) 1927. Sept. Vol. 39. No. 9. (No. 452). pp. 1313-1314. With 2 figs. on 1 plate. [Dept. Anatomy, Univ., Okayama.]

The process of recovering metacercariae from intermediate hosts by micro-dissection is laborious and unsatisfactory. Experimental feeding is also limited in application. The author recommends digestion in an artificial gastric juice kept at 37°-40° for 2 or 3 hours. Thereafter the cysts set free by the process may be concentrated by a slight rotatory motion of the dish owing to their high specific gravity. The method relies upon the established fact that the larvae do not escape from the cysts in the stomach of the definitive host.

R. T. L.

WALTON (C. L.) & WRIGHT (W. Rees). **Further Observations and Experiments on the Control of Liver Fluke.**—*Jl. Ministry Agric.* 1927. Nov. Vol. 34. No. 8. pp. 734-739. [8 refs.] [Dept. Agric., Univ. Coll. N. Wales, Bangor.]

Under laboratory conditions the egg masses of *Limnaea truncatula* cannot survive desiccation for more than 12 hours, and dilutions of CuSO₄ solution up to 1-10 per cent. are lethal within 48 hours. Although newly hatched *L. pereger* and *Aplexa* were killed by freezing; freezing did not adversely affect eggs or adults of *L. truncatula*. This is in accord with field observations. The adult *Limnaea truncatula*, although killed by direct desiccation, can resist drought conditions longer than other species such as *L. pereger*, *L. palustris*, *Aplexa* sp. and *Planorbis* living in association with it.

R. T. L.

TAKAHASHI (Sohzaburo). [Development History of *Fasciola hepatica*. L. with Special Reference to the Intermediate Host.]—*Fukuoka Ikadaigaku Zasshi* (Jl. Fukuoka Med. Soc.) 1927. May. Vol. 20. No. 5. [Summarized in *Japan Med. World*, 1927. Nov. 15. Vol. 7. No. 11. p. 336.]

Lymnaea pervis Mart. and *Lymnaea* sp? have been shown experimentally to be intermediate hosts of *Fasciola hepatica* in Kyushu, Japan.

R. T. L.

HEYDON (G. M.). *Paragonimus ringeri* in a New Guinea Native.—*Med. Jl. Australia*. 1927. Sept. 24. Supp. No. 7. pp. 204–205. With 1 text fig. [4 refs.] [Australian Inst. Trop. Med., Townsville, Queensland.]

Two specimens of *Paragonimus* were found post-mortem in the lung of a native of New Guinea by Dr. BACKHOUSE. From an examination of the spines on the skin between the oral and ventral suckers the author concludes that the worms belong to the species *ringeri*.

R. T. L.

HAYASHI (K.) & IGARI (D.). A Case of Nodules at Bottom of Hernia-Sac in Scrotum, caused by Eggs of *Paragonimus westermani*.—*Taiwan Igakkai Zasshi* (Jl. Med. Assoc. Formosa). 1927. Aug. No. 269. English summary p. 4. [In Japanese.]

A case is recorded in which variously sized nodules were discovered at the bottom of a replaceable hernia sac and are stated to have been due to the eggs of *Paragonimus*, the adults of which it is assumed had at one time inhabited this situation.

R. T. L.

ANDO (Akira) & TOHTARO (Kobori). [A Contribution to the Biological Studies of Trematodes. I. Relation between *Paragonimus westermani* and Ferments.]—*Aichi Igakkwai Zasshi* (Jl. Aichi Med. Soc.). 1927. Jan. Vol. 24. No. 1. [Summarized in *Japan Med. World*. 1927. Aug. 15. Vol. 7. No. 8. pp. 241–242.]

Whereas certain other trematodes found in the dog rather dislike oxygen the larvae and adults of *Paragonimus westermani* tend to agglomerate "at the puffing tip of oxygen gas 0.6 per cent. saline." These facts tend to indicate the reason why *Paragonimus* thrives better in the lungs than in any other organ.

R. T. L.

PILOD, CODVELLE & HUGONOT. Un cas de splénomégalie d'apparence primitive d'origine distomienne. [A Case of Splenomegaly, apparently Primary, due to *Clonorchis*.]—*Bull. et Mém. Soc. Méd. Hôpit. de Paris*. 1928. Jan. 19. Year 44. 3rd Ser. Vol. 52. No. 1. pp. 18–23.

Enlargement of the spleen is commonly associated with malaria, leishmania and bilharzia. The author attributes the splenic enlargement in a case of which he gives a detailed clinical account to the presence of large numbers of *Clonorchis sinensis* in the bile ducts. There was no ascites or jaundice and no change in the blood. The liver itself

showed no perceptible lesions and the splenic enlargement, while considerable, was discovered by chance. The diagnosis was reached by a process of exclusion.

R. T. L.

SIOE (Kwa Tjoan). Clonorchiosis. [**Clonorchiasis.**—*Geneesk. Tijdschr. v. Nederl.-Indië*. 1927. Vol. 67. No. 2. pp. 297-309.]

The author, working at Batavia, saw 7 cases of clonorchiasis, 4 of which are quoted in some detail. The clinical picture showed the usual features and eggs of the parasite were present in the stool in all the cases. The infection was exclusively found in Chinese (6 Hakka, 1 Kongfu). No cases are published so far concerning natives of the Dutch East Indies. This makes it probable that the author's patients had all been infected in China. If this presumption is right, it may be deduced from the history of one of the patients that the parasites may live for over 12 years in the human liver. The damage to the liver, which is the ultimate result of the infection, justifies treatment, even in cases in which no clinical symptoms are present. As regards treatment the author recommends gentian-violet and (more reluctantly in view of its by-effects) tartar emetic. In cases in which no results are obtained by these drugs or in which some contra-indication forbids their administration carbonas guaiacol (300 mgm. per day) may have a very satisfactory symptomatic effect.

W. J. Bais.

OLIVIER (P. H.) & KANDOU (R.). De behandeling van Clonorchiasis sinensis met Gentiaanviolet Grübler. [**The Treatment of Clonorchis sinensis Infection with Gentian Violet Grübler.**—*Geneesk. Tijdschr. v. Nederl.-Indië*. 1927. Vol. 67. No. 1. pp. 59-63. [6 refs.]

Though other drugs (such as tartar emetic, mercurochrome) may be used with success in the treatment of clonorchiasis in the comparative experiments of FAUST (see this *Bulletin*, Vol. 23, p. 755) gentian violet gave the most satisfactory results. This induced the authors to give the drug a trial in a case of uncomplicated clonorchiasis in a Chinese. The eggs disappeared from the faeces, and clinical recovery resulted after intravenous injection of 1 per cent. gentian violet Grübler, 20 cc., followed after 3 days by 30 cc. The cure had no by-effects, except the peculiar discoloration of the skin immediately after the injection and the violet colour of the urine.

The authors think that in other cases with more advanced fibrous alteration of the hepatic tissue the parasites may be not so easily accessible to the drug, and a cure may be more difficult to attain.

W. J. Bais.

WAYSON (N. E.). **Clonorchiasis Investigations. A Summary of Surveys and Experiments to determine whether Clonorchiasis may be disseminated on the Pacific Slope of the United States.**—*Public Health Rep.* 1927. Dec. 23. Vol. 42. No. 51. pp. 3129-3135. [2 refs.]

These surveys and experiments have led to no definite conclusions. No known Asiatic vector has established itself on the Pacific Slope and no native species has yet been implicated by laboratory experiment as a potential carrier,

R. T. L.

Iro (Kuwatara). [Blood Features of the Rabbit's Experimental Clonorchiasis.]—*Aichi Igakkwai Zasshi* (Jl. Aichi Med. Soc.). 1927. Feb. Vol. 37. No. 2. [Summarized in *Japan Med. World*. 1927. Sept. 15. Vol. 7. No. 9. p. 275.]

In rabbits experimentally infected with clonorchiasis the eosinophiles increased in all cases during the initial fortnight and then began to decrease. Lymphocytes and leukocytes, large mononuclears, transition forms and blood platelets showed no marked changes in slight and moderate cases. In serious or lethal cases the erythrocytes decreased abruptly. The leukocytes increased suddenly in the second week and in some lethal cases the eosinophiles abruptly decreased just before death.

R. T. L.

KOBORI (Kohtaro). [Contribution to the Study of the Second Intermediate Host of *Clonorchis sinensis*. I. Supplementary Host, *Pseudogobio eocinus*, occurring in the Vicinity of Nagoya City.]—*Aichi Igakkwai Zasshi* (Jl. Aichi Med. Soc.). 1927. Feb. Vol. 37. No. 2. [Summarized in *Japan Med. World*. 1927. Sept. 15. Vol. 7. No. 9. p. 275.]

The English abstract in the *Japan Med. World* adds nothing to the title concerning the contents of this Japanese paper.

R. T. L.

PIGOULÉWSKY (S. W.). Quatre cas de microcoeliose dans le vieux Tashkent. [Four Cases of *Dicrocoeliasis* in Tashkent.]—*Pensée Méd. d'Usbékistane*. Tashkent. 1927. No. 5. French summary pp. 85-86. [In Russian pp. 39-41.]

Dicrocoelium infection is very prevalent in sheep, cattle and goats in old Tashkent. Two cases in man have been recorded, one by Dr. LYSENKO, the other by Dr. WASSIELIEWA while several unpublished instances have been observed by Drs. SEMIONOW and KÉWORKOW. During an investigation extending over a period of six weeks the author has found four new cases. In one of these the infection was associated with *Fasciola hepatica* and *Hymenolepis nana*. In a second case *Hymenolepis nana* and *Enterobius vermicularis* also occurred, while in the two remaining cases no other parasites were found. In all the cases the number of eggs present in the stools was insignificant. The numbers were increased in the first few days of treatment with emetine.

R. T. L.

PIGOULESKY (S. W.). *Dicrocoeliose humaine en Asie moyenne Russe*. [Dicrocoeliasis in Man in Russian Asia.]—*Russian Jl. Trop. Med.* 1927. Vol. 5. No. 8. French summary p. 534. [In Russian pp. 483-485. 5 refs.]

Thirty-one cases of infection of man with *Dicrocoelium lanceatum* [*dendriticum*] were noticed during faecal examinations of the population of Tashkent. This parasite was also observed in 50 per cent. of cattle slaughtered in the local abattoir.

R. T. L.

STROM (J.). **On False Distomatoses in the Liver of Man.**—*Rev. Microbiol. et Epidémiol.* 1927. Vol. 6. No. 4. English summary pp. 476-477. [In Russian pp. 433-437.] [Inst. of Trop. Med., Uzbekistan.]

Absence of symptoms of disease of the liver and failure to find eggs on repeated occasions has suggested that the eggs found in the faeces in some cases have been derived from the consumption of liver of cattle as food. This has now been experimentally demonstrated to follow the eating of liver infected with *Fasciola hepatica* and *Dicrocoelium dendriticum*. Doubtless some of the cases of these infections in man already on record belong to this category.

R. T. L.

KHALIL (M.). **The Eradication of Bilharziasis : a Successful Attempt in an Endemic Area.**—*Lancet.* 1927. Dec. 10. p. 1235. [3 refs.]

Of the inhabitants of one of the villages in the Oasis Dakhla, situated 450 kilometres to the west of the Nile, 63.5 per cent. are infected with *S. haematobium*. The main stream of the village is of artesian origin and was found to contain large numbers of *Bullinus* snails. The addition of copper sulphate continuously for four days and four nights to this artesian water resulted in the death of the bilharzia carriers. The area was revisited six months later and no living *Bullinus* snails could be found.

The author gives to a brief note of this interesting trial a somewhat premature title.

R. T. L.

IBRAHIM (Ali). **The Problem of Bilharziasis in Egypt.**—*Jl. State Med.* 1927. Dec. Vol. 35. No. 12. pp. 702-708.

The author considers the use of copper sulphate for the control of bilharziasis on a large scale in the Nile Valley to be impracticable, although the method would be of great use in dealing with rice fields and small canals. At present Egypt is divided into four districts for purposes of irrigation. He suggests that on each consecutive year irrigation should be completely stopped in one of these four divisions during three summer months—the Department of Public Health to concentrate on the area all their activities for the treatment of infected cases.

R. T. L.

FRANÇA (Carlos). Observations sur la bilharziose. [**Notes on Bilharziasis.**]—*Bull. Soc. Portugaise des Sci. Nat.* 1925. Nov. Vol. 10. No. 5. pp. 63-77. [9 refs.]

1. The author is of opinion that the reduced size of the specimens of *Planorbis dufourii* found at Atalaia, Portugal, is due not merely to the temperature of the water, but to the constant and massive infection to which the snails are liable on account of the small area and high temperature in which they live.

2. He believes that the granular eggs which result from treatment in bilharzia cases are due to the effect of the drug in inducing abortion in the adult female worms.

3. He draws attention to the fact that in Angola and in W. Africa the majority of cases of intestinal bilharziasis are due to *S. haematobium*. In the region of Bengo he obtained a certain amount of evidence pointing to *Physalopsis globosa* as the intermediate host of *S. haematobium*. In the region of Chibia large numbers of *Planorbis pfeifferi* occur. This species has been demonstrated by Annie PORTER in S. Africa to be the host of *S. mansoni*, yet all the cases of infection which have been studied at Chibia have been infections with *S. haematobium*.

R. T. L.

THOMSON (J. H.). **Notes on Schistosomiasis.**—*Tanganyika Territory Ann. Med. & San. Rep. for the Year ending 31st December, 1926.* pp. 103-104.

Bilharzia disease (*S. haematobium*) is common around Mwanza: on the side of Smith's Sound, in Urima and Sima to the south of the Sound. Most of the 63 cases treated during the year came from the school at Nassa on the Speke Gulf. Inter-rectal [*sic*] injections of tartar emetic did not appear to do much good. A few cases on bismuth 20 grains weekly cleared up and were all discharged.

R. T. L.

FAIRBAIRN (H.). **Vesical Bilharzia: Double Infection with *S. haematobium* and *S. mansoni*.** [Memoranda.]—*Brit. Med. Jl.* 1928. Jan. 14. p. 52. [1 ref.]

COLEMAN (Robert B.). **Vesical Bilharzia: Double Infection.** [Memoranda.]—*Ibid.* Feb. 4. p. 177. [1 ref.]

Fairbairn describes from Tanganyika three cases of lateral spined eggs associated with terminal spined eggs in the urine. Coleman reports that at the C.M.S. Hospital, Old Cairo, Egypt, patients with vesical bilharzia, showing double infection with *S. haematobium* and *S. mansoni* have frequently been observed, and he refers to his previous publication on the subject.

R. T. L.

HUTCHISON (Harry S.). **The Pathology of Bilharziasis.**—*Amer. Jl. Path.* 1928. Jan. Vol. 4. No. 1. pp. 1-16. With 14 figs. on 6 plates. [13 refs.] [Depts. of Path., Western Reserve Univ. & Cleveland City Hosp., Cleveland, O., & American Mission Hosp., Tanta, Egypt.]

Bilharzia worms and ova in the tissues induce a primary inflammatory reaction of a non-suppurative nature. They have no inherent capacity to produce ulceration. The latter seems to depend on secondary bacterial invaders acting on tissues of diminished vitality. Abscess formation has not been seen in the deeper tissues or in the abdominal organs. The ova, at first surrounded by inflammatory cells, become isolated by fibroblasts and giant cells of the foreign body type. Ultimately a granuloma forms, the characteristic unit of which is the

bilharzial pseudo-tubercle. The bilharzia worms produce nocuous substances which are probably the result of simple protein splitting rather than toxin production.

R. T. L.

BRUMPT (E.) & WERBLUNSKY (S.). Infection expérimentale d'un mollusque de Corse (*Bullinus contortus*) par le *Schistosoma haematobium*, agent de la bilharziose vésicale. [**Experimental Infection of a Corsican Mollusc by *S. haematobium*.**—*Bull. Acad. Méd.* 1928. Jan. 31. Year 92. 3rd Ser. Vol. 99. No. 5. pp. 153-155.]

DOLLFUS (1922) and more recently ANDERSON (1927) have drawn attention to the risk of introduction of schistosomiasis into Corsica, where *Bullinus contortus* occurs, through infected persons, and particularly soldiers of African origin, entering the island from districts where urinary bilharziasis is endemic. It is pointed out that the conditions are very favourable for the development of an endemic centre in the region of Porto Vecchio.

R. T. L.

FAIRLEY (N. Hamilton) & WILLIAMS (F. Eleanor). **A Preliminary Report on an Intradermal Reaction in Schistosomiasis.**—*Med. Jl. Australia*. 1927. Dec. 10. 14th Year. Vol. 2. No. 24. pp. 811-818. [17 refs.] [Walter & Eliza Hall Inst., Melbourne.]

With antigen derived from the dried powdered livers of snails infected with *Schistosoma spindalis* the authors have obtained a new intradermal skin test for bilharziasis. The reaction is characterized by a rapidly appearing large white wheal surrounded by a zone of erythema. Delayed reactions occur 3 to 24 hours after the initial injection. Seven out of eight patients with *S. haematobium* gave immediate reactions and three of them showed delayed responses. The test is of diagnostic value only and does not afford an indication of the success of treatment, for two patients, who were regarded as cured both on serological and clinical grounds, gave positive reactions.

R. T. L.

TOOTELL (George T.). **Further Observations on the Treatment of Schistosomiasis Japonica.**—*China Med. Jl.* 1927. Aug. Vol. 41. No. 8. pp. 718-722. [3 refs.]

Five cases of Schistosomiasis japonica were treated with antimosan. One had severe reactions, but generally the reactions were milder than with tartar emetic. Antimosan proved to be almost as effective, but its present cost renders it prohibitive for routine use. Eight patients were given mercurochrome. There were very severe reactions and uncertain effects and the drug does not appear to be a satisfactory one for use in this disease. Twelve cases were treated with tartar emetic. Treatment averaged 23 days for those cases which were apparently cured. The moderately severe reactions produced by this drug and the length of time required for cure, make it important to continue the search for a more efficient drug.

R. T. L.

HOFFMAN (William A.). **Studies on Schistosomiasis (*S. mansoni*) in Porto Rico. I. Preliminary Report on the Distribution of *S. mansoni*.**—*Porto Rico Rev. of Pub. Health & Trop. Med.* 1927. Dec. Vol. 3. No. 6. pp. 223-230. With 1 text fig. & 1 map. [5 refs.] [School of Trop. Med., Univ. of Porto Rico.]

Planorbis guadeloupensis, already implicated as the carrier of intestinal bilharziasis elsewhere in the New World, has been shown by the author to be the common carrier in Porto Rico. Rats have been experimentally infected from naturally infected snails. The intermediate host occurs abundantly in irrigation ditches around Guayama and at least 8 per cent. were found naturally infected. Utuado is an important centre of the disease, which was found in 8 out of 10 districts investigated, so that infection is much more widely distributed in Porto Rico than has hitherto been supposed. These surveys are being continued.

R. T. L.

LAMBERT (Robert A.). **Studies on Schistosomiasis (*S. mansoni*) in Porto Rico. II. Preliminary Report on Findings in 100 Routine Autopsies.**—*Porto Rico Rev. of Pub. Health & Trop. Med.* 1927. Dec. Vol. 3. No. 6. pp. 231-234. [2 refs.] [School of Trop. Med., Univ. of Porto Rico.]

Of the first 100 cases examined specifically for bilharzia in the course of routine post-mortem examinations in the Pathological Laboratory of the School of Tropical Medicine of the University of Porto Rico, 11 cases showed evidence of existing or recent infection. Only in 2, however, was bilharzia the direct cause of death. In these there were lesions of advanced cirrhosis of the liver. An additional case was afterwards found during the examination of an ovary removed by the surgeon.

R. T. L.

WALRAVENS (P.). **Le traitement de la bilharziose. [Treatment of Bilharziasis.]**—*Ann. Soc. Belge de Méd. Trop.* 1927. Nov. Vol. 7. No. 2. pp. 181-183. [1 ref.] [Bact. Lab., Elisabethville, Belgian Congo.]

The author gives brief notes on six cases of bilharzia treated with stibosan and five cases with antimosan by intravenous injection.

R. T. L.

ASADA (Junichi). **[On a New Species of Trematodes found Parasitic in the Dog in Tokyo. A Contribution to the Knowledge of the Distribution of Trematodes of the Dog.]**—*Tokyo Iji-Shinshi (Tokyo Med. News.)* 1927. May. No. 2522. [Summarized in *Japan Med. World.* 1927. Oct. 15. Vol. 7. No. 10. pp. 303-304.]

In 160 stray dogs, in Tokyo, eight trematode species were discovered, viz., *Clonorchis sinensis* (7 cases), *Pygidioopsis summus* (3 cases), *Metagonimus yokogawai* (9 cases), *Heterophyes nocens* (2 cases), *Heterophyes continus* (3 cases), *Echinochasmus elongatus* (2 cases), *Echinostoma conetorchis* (2 cases), and *Echinostoma hortense* (1 case). An unnamed new species is mentioned as closely related to *Aptorchis oegnalis*.

R. T. L.

JOYEUX (Ch.) & HOUEMER (E.). Recherches sur la faune helminthologique de l'Indochine (cestodes et trematodes). [**Cestodes and Trematodes of Indo-China.**]—*Ann. Parasit. Humaine et Comparée*. 1927. Oct. 1. Vol. 5. No. 4. pp. 289-309; 1928. Jan. 1. Vol. 6. No. 1. pp. 27-58. With 14 text figs. [90 refs.] [Lab. Parasit., Faculty of Med., Paris.]

This paper contains a systematic account of a considerable number of tapeworms found in various hosts in Indo-China. Those of medical interest mentioned are *Taenia saginata*, the cysticercus of which is frequently found in beef at Hanoi; 11.76 per cent. of the cattle there are infested. *Cysticercus cellulosae* is recorded from pigs and is stated to be rare in the dog (.14 per cent.). Hydatid is very common in cattle and is especially so in pigs.

R. T. L.

ESSEX (Hiram E.). **Early Development of *Diphyllbothrium latum* in Northern Minnesota.**—*Jl. Parasit.* 1927. Dec. Vol. 14. No. 2. pp. 106-109. With 5 text figs. [2 refs.] [Zool. Lab., Univ. of Illinois.]

The eggs of *D. latum* hatched after an incubation period of 9 to 12 days, the majority requiring 11 days. As *Cyclops strenuus* could not be found in Minnesota, eight other species were used for experiment. In *Cyclops brevispinosus* and *C. prasinus* embryos were found in the intestine a few hours after feeding but in no case did infection actually occur. Experiments with *Diaptomus oregonensis* were more successful. The author illustrates and describes the various phases of development and in these matters closely agrees with the results of JANICKI and ROSEN [see this *Bulletin*, Vol. 17, p. 66].

R. T. L.

JOYEUX (Ch.) & BAER (J. G.). Sur quelques larves de bothriocéphales. [**Larvae of Bothriocephalus Species.**]—*Bull. Soc. Path. Exot.* 1927. Nov. 9. Vol. 20. No. 9. pp. 921-937. With 4 text figs. [24 refs.] [Parasit. Lab., Faculty of Med., Paris]

The authors have studied the adult tapeworm developed in the cat and dog from Plerocercoides found in the snake *Tropidonotus natrix*. They have found experimentally that the proceroid stage can develop in *Cyclops fuscus*. The adult worm is identified as *Diphyllbothrium ranarum* which in their opinion is the same as *D. replans* over which it has priority. They have shown experimentally also that the plerocercoids of this parasite can undergo a sexual multiplication in frogs.

R. T. L.

LOPEZ-NEYRA (C. R.). Considérations sur le genre *Dipylidium* Leuckart. [**Notes on the Genus *Dipylidium*.**]—*Bull. Soc. Path. Exot.* 1927. May 11. Vol. 20. No. 5. pp. 434-440. [1 ref.]

The genus *Dipylidium* Leuckart 1863, contains about thirty species, of which only eighteen are well known. The author discusses the various morphological types found within the genus and considers that three distinct genera must be recognized viz. :—

I. DIPYLIDIUM. Type species *D. caninum* (Linnaeus 1758) and 11 additional species: *D. oerleyi* (v. Ratz 1900), *D. sexcoronatum* (v. Ratz 1900), *D. walkeri* (Sondhi 1923), *D. rossicum* (Skriatin 1923),

D. halli (Tubangui 1925), *D. baencaminoi* (Tubangui 1925), *D. gracile* (Millzner 1926), *D. compactum* (Millzner 1926), *D. diffusum* (Millzner 1926), *D. longulum* (Millzner 1926), *D. crassum* (Millzner 1926).

II. JOYEUXIA n. gen., Type species *D. chyzeri* (Diamare 1892) with 4 additional species: *J. pasqualei* (Diamare 1892), *J. echinorhynchoides* (Sonsino 1889), *J. gervaisi* (Setti 1895), *J. fuhrmanni* (Bare 1924).

III. DIPLOPYLIDIUM. (Beddard 1913). Type species: *D. genettæ* (Beddard 1913) and 7 additional species, viz., *D. trinchesei* (Diamare 1892), *D. triseriale* (Lühe 1896), *D. monoophorum* (Lühe 1898), *D. columbae* (Fuhrmann 1909), *D. zschokkei* (Hungerbühler 1910), *D. quinquecoronatum* (Lopez-Neyra & Munoz 1921), *D. noelleri* (Skriabin 1924).

The above classification does not include four species which have been insufficiently described, viz. *D. genettæ* (Gervais 1847), *D. monticelli* (Diamare 1893), *D. avicola* (Fuhrmann 1906) and *D. dongolense* (Beddard 1913).

R. T. L.

SCRIMAGLIO (E. F.). [*Hymenolepis nana*.]—*Revista Méd. d. Rosario*. Rosario de Santa Fe. 1927. Aug. Vol. 17. p. 401. [Summarized in *Jl. Amer. Med. Assoc.* 1927. Dec. 17. Vol. 89. No. 25. p. 2148.]

Nine cases of *Hymenolepis nana* occurred among 600 persons. Vast numbers of eggs were fed to rats without results. The author concludes that the rat is not an intermediary. Eosinophilia was an inconstant feature of the cases.

R. T. L.

BARNETT (L. E.). **Colossal Hydatid Cysts.**—*Med. Jl. Australia*. 1927. Dec. 24. 14th Year. Vol. 2. No. 26. pp. 878-882. With 5 text figs. [4 refs.]

Describing the largest hydatid cyst or accumulation of cysts on record Sir L. E. Barnett points out that these huge cysts have in common a precedent effusion of bile into the abdominal cavity which he considers to be an essential factor in permitting the subsequent growth of abdominal hydatid cysts to super dimensions. The patient was an Otago countryman aged 39. The quantity of fluid and the contained daughter cysts evacuated was 50 litres (eleven gallons). The eosinophile count was only 2 per cent.

R. T. L.

MATTHIASSEN (Steingrímur). **Hydatid Disease in Iceland.**—*World's Health*. 1927. Nov. Vol. 8. No. 11. pp. 408-411. With 3 text figs.

About 60 years ago hydatids were so common in Iceland that Dr. J. FINSSEN estimated that about 2 per cent. of the population were infected. The most recent statistics indicate that less than 1 in 1,500 is affected. This remarkable decrease is attributed to the law passed in May 1890 controlling the dogs by taxation and treatment and enforcing the burial or burning of hydatid infected material. The number of dogs per head of population has been reduced from 1 to every 3 or 5 persons to 1 per every 15 persons.

R. T. L.

GUTHRIE (Neil). **The X Ray Examination of Intrathoracic and Sub-diaphragmatic Hydatid Disease and its Complications.**—*Med. Jl. Australia*. 1927. Nov. 5. Supplement No. 11. pp. 324-326. [3 refs.]

The detection of an uncomplicated hydatid cyst by X-rays may depend upon the increased or decreased radiability of the pericystic medium. In bone the X-ray will demonstrate the "cavitation." Typical cystic appearances of the lung are frequently masked by complications. Sarcoma of the lung may present appearances indistinguishable from hydatid. Secondary metastasis of the embolic type can be recognized since the primary tumour elsewhere will be detected. A very large cyst may closely resemble a large pleural effusion. The X-ray appearances of spontaneous rupture into the pleural cavity may be those of a large hydrothorax. Except where the disease is located on the upper surface of the liver or spleen an ordinary X-ray examination will be of little assistance with abdominal hydatid cases. Radiological examination is of great value to the surgeon in illuminating post-operative complications, such as incomplete drainage, hydro-pneumothorax, recession of the lung, lung abscess and hydrothorax.

R. T. L.

STAWELL (R. R.). **The Medical Aspect of Hydatid Disease.**—*Med. Jl. Australia*. 1927. Nov. 5. Supplement No. 11. pp. 323-324.

Hydatid infection occurs most commonly in childhood. The so-called toxic symptoms are manifestations of anaphylaxis. Absorption of hydatid poison occurs whenever the cyst is injured, even when this injury is very slight. With instant and complete rupture of the cyst the toxic manifestations are fulminating and sometimes fatal. No toxic symptoms occur at the time of operation on hydatid because general anaesthesia abolishes the anaphylactic state, although this may supervene after the operation. The chronic condition of ill health called "hydatid diathesis" is probably of toxic origin. In diagnosis one of the commonest errors is to mistake a hydatid cyst for gall stones in cases of jaundice with hepatic enlargement. The author considers the prohibition of feeding infected material to dogs as the only feasible plan of ultimate prevention.

R. T. L.

DÉVÉ (F.). La cuticulisatión des capsules prolifères échinococciques. [**Cuticulization of Brood Capsules of Echinococcus.**]—*Ann. Parasit. Humaine et Comparée*. 1927. Oct. 1. Vol. 5. No. 4. pp. 310-328. With 8 text figs. [23 refs.]

Brood capsules cannot become transformed into echinococcus cysts. They take no part in the formation of secondary hydatids. Daughter cysts cannot be derived directly from the germinative layer of the mother cysts. The scolex is the exclusive source of the endogenous cyst of the first generation.

R. T. L.

COUTELÉN (F.). Sur l'évolution vésiculaire *in vitro* des scolex échinococciques. [**The Vesicular Development in vitro of Echinococcic Scolexes.**]—*Ann. Parasit. Humaine et Comparée*. 1927. July 1. Vol. 5. No. 3. pp. 239-242. With 2 figs. [2 refs.] [Faculty of Med., Paris.]

Continuing his earlier work on the development of hydatids *in vitro* the author has now made a histological study of the scolices thus developed. He finds all stages between the normal scolex and those markedly vesicular. The appearances are identical in fact with those described by DÉVÉ in his researches *in vivo* on secondary echinococcosis in man and domesticated animals.

R. T. L.

HARNETT (W. L.). **A Case of Hydatid Cyst of the Liver.**—*Indian Med. Gaz.* 1928. Jan. Vol. 63. No. 1. pp. 16-17. With 1 text fig.

This case occurred in a Hindu aged eight from the Mozufferpur district of Bihar. One year previously a hard round painless swelling about one inch in diameter was noticed in the epigastrium which gradually increased in size and became slightly tender. At the time of operation there was a globular swelling about 3 by 2½ inches extending downwards from the epigastrium for about four fingers breadth. The tumour was dull on palpation and gave no hydatid fremitus.

R. T. L.

CAMERON (W. M.). **A Case of Somatic Infection with *Cysticercus cellulosae*.**—*Jl. Roy. Army Med. Corps*. 1928. Feb. Vol. 50. No. 2. pp. 128-130.

Two cases of cysticercosis, apparently both acquired during residence in India, are recorded in this paper. In one there were no symptoms, the diagnosis was confirmed by excision of a cyst. In the other case there were cerebral symptoms—fits, with mental excitement, associated with general debility. Numerous small nodules about the size of a pea were freely movable under the skin, chiefly in the muscles of the arms and shoulders, but occurring also in all parts of the body. The eosinophilia amounted to 11 per cent. In neither case could an associated infection with *Taenia solium* be determined.

R. T. L.

RAMSDALL (Susan Griffith). **A Note on the Skin-Reaction in *Taenia* Infestation.**—*Jl. Parasit.* 1927. Dec. Vol. 14. No. 2. pp. 102-105. [5 refs.] [Univ. Health Service Lab., Univ. Texas.]

There is evidence of the occurrence of a skin sensitization and of an antitoxin production in *Taenia saginata* infection, but the skin reaction is not strictly specific and the toxins produced are not active as haemolysin or agglutinin.

R. T. L.

REBELLO (Silvio), DA COSTA (S. F. Gomes) & RICO (J. Toscano). Réactions des cestodes étudiées par la méthode graphique (*Taenia serrata* et *Dipylidium caninum*). [Reactions of Cestodes studied by the Graphic Method.]—*C.R. Soc. Biol.* 1928. Feb. 17. Vol. 98. No. 6. pp. 470-473. With 2 text figs. [2 refs.] [Pharm. & Therap. Inst., Faculty of Med., Lisbon.]

In Rhode-Saito fluid kept at 38° C., pH 6.4, the segments of *Taenia serrata* and *Dipylidium caninum* retained their activity for 2 days. Isolated proglottids can be made to give interesting graphs showing their contractions and the effect thereon of anthelmintics.

R. T. L.

BROWN (H. W.). **A Study of the Regularity of Egg-Production of *Ascaris lumbricoides*, *Necator americanus* and *Trichuris trichiura*.**—*Jl. Parasit.* 1927. Dec. Vol. 14. No. 2. pp. 110-119. [5 refs.] [School of Hyg., Johns Hopkins Univ., Baltimore, Md.]

Judging by a comparison of the coefficients of variation of the eggs and grams of faeces passed per day the egg production by *Necator americanus*, *Ascaris lumbricoides* and *Trichuris trichiura* is, within errors due to size of infestations, equally regular. Egg count data from hosts harbouring these worms give an index of the number of worms harboured and surveys of population groups give for *Ascaris lumbricoides* and *Trichuris trichiura* results as reliable as for *Necator americanus*.

R. T. L.

BROWN (H. W.) & CORT (W. W.). **The Egg Production of *Ascaris lumbricoides*.**—*Jl. Parasit.* 1927. Dec. Vol. 14. No. 2. pp. 88-90. [6 refs.] [Sch. of Hyg., Johns Hopkins Univ., Baltimore, Md.]

A boy 5 years old passed approximately 10,064,000 ascaris eggs in a single day. After treatment 43 females and 24 males were obtained, giving about 234,000 eggs per day for each female. A boy, 13 years old, passed about 735,000 unfertilized eggs in three days and after treatment passed a single large female worm, giving thus an average daily output of about 245,000 eggs. In these two cases the eggs passed per gram weight of female adult averaged nearly 2,000. On examination of two large series of unpublished egg counts made by the China Hookworm Commission and the Hookworm Expedition to Panama, the authors conclude that the average egg production of ascaris cannot be very much lower than in these two cases. The figures indicate remarkable fecundity and an almost unbelievable wastage in view of the fact that the human ascaris has no hazards which accompany free larval stages or life in an intermediate host and has an egg shell which is unusually resistant to environmental conditions.

R. T. L.

BROWN (Harold W.). **Studies on the Rate of Development and Viability of the Eggs of *Ascaris lumbricoides* and *Trichuris trichiura* under Field Conditions.**—*Jl. Parasit.* 1927. Sept. Vol. 14. No. 1. pp. 1-15. With 2 text figs. [19 refs.] [School of Hyg., Johns Hopkins Univ., Baltimore, Md.]

An analysis is made of some of the influences which affect the development and viability of eggs under different sets of conditions in nature.

This indicates that the type of soil is an important factor. *Ascaris* eggs developed to the motile embryo stage in 15 days while the eggs of the whipworm reached the same stage in 21 days. 100 per cent. of the eggs of both species underwent degeneration in sand exposed to the sun for a comparatively short time. In humus soil the development of cultures of *Ascaris* eggs was at least 20 days behind that in sand, clay and loam soils.

R. T. L.

HIRAISHI (Teiichi). [**Pig Infection with the Ascarid Larvae. (A Supplementary Report).**—*Keio-O Igaku (Jl. Kei-O Med. Soc.)*. 1927. Jan. Vol. 7. No. 1. [Summarized in *Japan Med. World*. 1927. Aug. 15. Vol. 7. No. 8. pp. 243-244.]

A group of sucklings which had been fed upon a vitamin A deficient ration had a higher morbidity with ascariasis than those which had been fed on a ration containing cod liver oil. In vitamin A deficient animals the clinical symptoms developed early and ran a serious and prolonged course while in the others the symptoms were, if any, slight and of short duration. The pathological changes in the lungs also differed markedly.

R. T. L.

HIRASAWA (Ichizo). [**Experimental Studies on the Per-Oral Infection with the Ascarid Larvae hatched in the Open Air, in Special Reference to the Processes of Development in the Bodies of the Proper Host or Alien Hosts.**—*Tokyo Iji-Shinshi (Tokyo Med. News)*. 1927. July. No. 2532. [Summarized in *Japan Med. World*. 1927. Nov. 15. Vol. 7. No. 11. pp. 332-333.]

After hatching in an artificial medium, the larvae of *Ascaris lumbricoides* remain alive for a considerable time but do not appear to develop, but *Belascaris marginata* larvae appear to grow a little. When administered by the mouth experimentally the infection follows in the same manner as when embryonated eggs are given.

R. T. L.

ALFEEVA (S.). **On the Question of the Migration of *Ascaris* and *Oxyuris* into the Tissues of the Intestinal Tumor in Man.**—*Rev. Microbiol. et Epidémiol.* 1927. Vol. 6. No. 4. English summary p. 476. [In Russian pp. 423-432. Numerous refs.]

Evidence is given that ascaris and oxyuris can move actively through the living tissues of the gut wall making long sinuses in their progress.

R. T. L.

LEGER (Marcel). **L'ankylostomiase dans nos colonies de l'Afrique Occidentale Française. [Ankylostomiasis in the Colonies of French West Africa.]**—*Rev. Prat. Malad. des Pays Chauds*. 1927. June. Vol. 7. No. 6. pp. 308-321. [35 refs.]

Leger has rightly thought it useful to summarize the somewhat scattered literature which deals with the incidence of hookworm in the West African Colonial Empire of France. He points out that hookworm is generally prevalent, but suggests further inquiry into: (a) relative proportion of the two species *N. americanus* and *A. duodenale*; and (b) the relative proportion of diseased persons and carriers.

R. T. L.

HILL (Rolla B.). **Hookworm Infestation in an Unsanitated District, after an Intensive Treatment Campaign.**—*Jl. Preventive Med.* 1927. Nov. Vol. 1. No. 8. pp. 537-545. With 1 text fig. [10 refs.] [Internat. Health Division, Rockefeller Foundation, New York.]

The considerable degree of reinfestation with hookworm, amounting in some cases to 20 per cent. of the original intensity within a year, indicates that treatment alone can do nothing more than temporarily alleviate the situation. In an unsanitated rural area in Porto Rico, the author treated 1,000 people intensively until the majority were cured. 98 per cent. of the people were originally positive, 73 per cent. became cured, but 81 per cent. were again positive during the following year.

R. T. L.

HEYDON (G. M.). **Observations on Conditions affecting Hookworm Ova and Larvae.**—*Med. Jl. Australia.* 1927. Nov. 5. 14th Year. Vol. 2. No. 19. pp. 640-645. [6 refs.] [Australian Inst. of Trop. Med., Townsville, Queensland.]

In this paper the author has studied the survival of hookworm eggs in the pans of latrines in use in many parts of Queensland. His observations on the action of urine, thought to be mainly responsible for the rapid destruction of ova in the pans, differ markedly from the findings of MAPLESTONE. Urine has a detrimental effect also on hatched larvae and on the sheathed infective forms. This action is due mainly to the ammonia formed on decomposition. *A. duodenale* ova and larvae are much more resistant than those of *N. americanus*. Even under the most favourable conditions of temperature and urine admixture the ova of *A. duodenale* often survive more than a week in Queensland privy pans.

R. T. L.

HEYDON (G. M.). **The Influence in Hookworm Infection of the Species of Worm and of the Race of Man and on the Characters of the Larvae as a Means of determining the Species Distribution.**—*Med. Jl. Australia.* 1927. Sept. 24. Supp. No. 7. pp. 206-208. [3 refs.] [Australian Inst. of Trop. Med., Townsville, Queensland.]

Heydon is surprised that little or no emphasis is placed on the fact that the two hookworm species are not of equal importance as producers of disease in man. Tolerance of infestation varies enormously with diet and the state of nutrition, with age, with the severity of physical labour and from unknown causes such as those classed as individual and racial susceptibility. At Townsville in Northern Queensland the cases of serious disease encountered so far have been caused by *A. duodenale*, although both species are common. Hitherto a worm count after treatment with anthelmintic has been the only method available for determining the species distribution. The author suggests that advantage could be taken of the differences between the mature larvae, which are striking and readily seen. The method is applicable to the examination of specimens of earth suspected of containing hookworm larvae as well as small faecal specimens. It is recognized that the larvae may be accompanied by numbers of free-living nematode larvae and by the larvae of hookworms of the cat and dog.

R. T. L.

GIGLIOLI (G.). **Report on Hookworm Survey carried out at Mackenzie and Akyma from July 1st to 11th, 1925.**—*British Guiana Med. Annual 1925.* pp. 34-36.

The examination of 100 specimens from common labourers has definitely proved that the repetition of a hookworm mass treatment is unnecessary as long as the importation of new infection is prevented by the treatment of all newcomers and the prevention, by a conservancy system, of soil pollution from the small residue of infected persons who have not been medically cured by carbon tetrachloride.

R. T. L.

MUKERJI (A. K.). **Physical Efficiency in Hookworm Infection. A Preliminary Report.**—*Indian Med. Gaz.* 1927. Oct. Vol. 62. No. 10. pp. 562-565. [13 refs.]

Mukerji has failed to demonstrate any loss of physical efficiency in light hookworm infections. From a study of prisoners by Schneider's cardio-vascular test, except in a few cases which may lie within normal variations, he was unable to detect any appreciable rise in the efficiency score after the expulsion of the worms.

R. T. L.

LANE (Clayton). **Migration of Hookworm Larvae from Cultures.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1928. Jan. 31. Vol. 21. No. 4. pp. 309-314. With 3 figs. (2 on plate). [2 refs.]

Continuing his valuable researches on the factors which determine whether hookworm ova shall develop into larvae and whether these shall grow to infective forms the author has devised ingenious experiments by which there is a control of single factors and in which an attempt has been made to secure uniformity in material and circumstance. The results strikingly support his contention that no importance can be attached to the conclusion that the number of larvae recovered by the soakage of a culture represents all, or practically all, the larvae which have developed in that culture. Indeed it appears practically certain that in hydraulic and other conditions which are favourable to migration the better nourished and the more vigorous the larvae the fewer remain behind in the culture for enumeration. Untrapped cultures can afford, then, no assured indication as to the viability of hookworm ova, the longevity of larvae in soil, or the degree of migration in soil. Our present knowledge on these important matters is based upon fallacious studies with untrapped cultures.

R. T. L.

YOKOGAWA (Sadamu). **Results of Comparative Studies on Oral and Cutaneous Infection of Dogs with *Ancylostoma caninum*.**—*Abhandl. a. d. Gebiet d. Auslandskunde. Hamburg. Univ.* 1927. Vol. 26. (D., Med. & Vet. Vol. 2.) [Festschrift NOCHT.] pp. 608-611.

Yokogawa affirms that the mature (encysted) larvae of the hookworm generally do not migrate in the natural host and that if any migration takes place in a natural host, such migration is to be looked upon simply as accidental and does not form a definite step in the scheme of the life history of the worm. Evidence from experiments on dogs is given to

prove that infection with hookworm can be more easily and heavily effected through the mouth than through the skin. 45.1-85.7 per cent. of the larvae given by the mouth were found in the intestine while only 4.7-36.9 per cent. of those applied to the skin reached the intestine. The author, however, does not wish it to be understood that these conclusions are immediately applicable to man. It should however, be borne in mind that hookworm infection can easily be established through the mouth.

R. T. L.

SCHWARTZ (Benjamin). **Description of *Ancylostoma pluridentatum*, a Hookworm of Carnivores, and a Review of the Genus *Ancylostoma*.**—*Proc. U.S. Nat. Museum*. 1927. Vol. 72. Art. 1. 9 pp. With 6 figs. [9 refs.]

Schwartz describes anew the anatomy of *Ancylostoma pluridentatum* and clears up certain doubts which led DARLING to the view that this species was probably identical with *A. braziliense*. A useful key indicating the relationships of the eight known species of the genus *Ancylostoma* is added. *A. caninum*, *A. conepti*, and *A. mucronatum* have three pairs of well developed ventral teeth. In *A. duodenale* the third pair is almost rudimentary. In *A. malayanum* and *A. mycetis* apparently only two pairs are present. In *A. pluridentatum* and *A. braziliense* there is one pair of well developed teeth and one pair of rudimentary. The author suggests that each species with less than three pairs of well developed teeth represents a mutation from the *A. caninum* type.

I. Three pairs of teeth in anterior ventral portion of buccal capsule ; medio-lateral and postero-lateral rays divergent.

1. Inner pair of teeth small or rudimentary *A. duodenale*

2. Inner pair of teeth well developed :—

A. Species inadequately described ; from an edentate (*Dasypus gilvipes*) *A. mucronatum*

B. Species adequately described ; from carnivores.

(a) Spicules 600-900 μ long *A. caninum*

(b) Spicules 1.8-2.2 mm. long *A. conepti*

II. Two pairs of teeth in anterior ventral portion of buccal capsule ; medio-lateral and postero-lateral rays close together and parallel.

1. Inner pair of teeth small or rudimentary :

A. Three pairs of small toothlike projections present on dorsal wall of buccal capsule *A. pluridentatum*.

B. Toothlike projections not present on dorsal wall of buccal capsule *A. braziliense*

2. Inner pair of teeth well developed :

A. Species inadequately described ; from a primate (*Mycetes coraya*) *A. mycetis*

B. Species adequately described ; from carnivores (*Ursidae*)
A. malayanum

R. T. L.

VAN THIEL (P. H.). **Some Remarks in consequence of the Researches of Svensson and Kessel on Necator and Ancylostoma Larvae.**—*Jl. Parasit.* 1927. Dec. Vol. 14. No. 2. pp. 95-96. [7 refs.] [Inst. of Trop. Med., Leyden.]

Van Thiel refers to his early work (1924) differentiating the strongyloid larvae of the hookworms of man and of the dog and draws attention to the fact that the larvae originally described by him as those of *Ancylostoma*

caninum belong to *Uncinaria stenocephala*. In the latter as contrasted with the larvae of *A. duodenale* the tail is strikingly obtuse and the intestinal valves are not so obvious.

R. T. L.

LAMSON (P. D.), MINOT (A. S.) & ROBBINS (B. H.). **The Prevention and Treatment of Carbon Tetrachloride Intoxication.**—*Jl. Amer. Med. Assoc.* 1928. Feb. 4. Vol. 90. No. 5. pp. 345-349. [11 refs.] [Vanderbilt University School of Med., Nashville, Tenn.]

Doses of 2.5 to 3 cc. of carbon tetrachloride removes from 95-100 per cent. of *Necator americanus* and is only slightly less effective against *Ancylostoma duodenale*. Hundreds of thousands of cases have been treated since its introduction in 1921 by Dr. M. C. HALL. The number of fatalities from its use in hookworm disease has been extremely small. These have been thought to be due to impurities, but cases of intoxication have occurred with extremely pure carbon tetrachloride and it would appear from the experimental enquiry conducted by the authors that intoxication from carbon tetrachloride is due to one of four complications: (a) irritation or mechanical obstruction by ascarids which are stimulated to marked activity by this drug; (b) a chronic alcoholism—it is recommended that these patients should be refused treatment; (c) the presence of undigested food in the intestine, especially a fatty food.—Carbon tetrachloride should always be given on an empty stomach, and should not be followed by fatty foods for a considerable period; (d) calcium deficiency explains most of the accidents that have occurred in children and where the doses given were so small as to seem at first insufficient to cause death. There is a considerable latent period, varying from 24-36 hours, before the onset of symptoms of nausea and sometimes uncontrollable vomiting. When both the calcium ion and fibrinogen content of the blood are low intestinal haemorrhages may be uncontrollable. Inadequate calcium reserve is present in most normal individuals and children, but should be built up as a routine procedure in the poorly nourished by adding to the daily diet about one quart of milk or by prescribing calcium lactate, carbonate or chloride, although these are apt to cause gastric disturbance. About 3 gm. daily should be administered in divided doses for about one week before treatment. Ammonium chloride or hydrochloric acid by the mouth is also effective in making stored calcium available. These drugs may be given for the relief of symptoms, but should be stopped when signs of air hunger indicate that an undesirable degree of acidosis is being produced. Parathyroid extract has been used very successfully in raising the blood calcium in carbon tetrachloride intoxication. Subcutaneous injections are given at intervals of several hours.

It should be remarked that the experimental data upon which the authors have based their conclusions have been derived from studies on dogs.

R. T. L.

SOLOVIEUF (N.). Sur le rôle d'*Enterobius* (*Oxyuris*) dans l'étiologie d'appendicites. [**The Role of *Oxyuris* in the Aetiology of Appendicitis.**]—*Rev. Microbiol. et Epidémiol.* 1927. Vol. 6. No. 3. French summary p. 373. [In Russian pp. 265-274. 11 refs.]

From 144 appendices the author obtained specimens of oxyuris in 46.53 per cent. Secondary infection through the damaged mucosa

may give rise to appendicitis. Oxyuris plays a more important rôle than trichocephalus since it occurs much more commonly in cases of appendicitis.

R. T. L.

BACHMAN (George W.). **A Precipitin Test in Experimental Trichiniasis.**—*Jl. Preventive Med.* 1928. Jan. Vol. 2. No. 1. pp. 35-48. [11 refs.] [Dept. of Hyg. & Bact., Univ. of Chicago.]

The failure of earlier workers to detect trichinella infection by serological methods was due to the fact that they used saline, alcohol and ether extracts as test-tube antigens instead of using the isolated parasite. In such tissue extracts the author failed also to detect precipitins. By freeing the larvae from infected muscle by artificial digestion and by hydrolysing the dried worm powder in 0.1 per cent. hydrochloric acid a satisfactory antigen was obtained. The acid solution could be used unmodified for artificial immunization of rabbits, and precipitins were detectable in high concentration 5 days after the last injection. After about the 40th day they began to diminish and disappeared about the 70th day. In rabbits infected with trichinosis by experimental feeding precipitins were not demonstrable until the 30th day, then increased until the 90th and still detectable after 227 days in 2 cases and 367 days in the third case. In the serum of a patient suffering from trichinosis precipitins were demonstrable in an antigen dilution of 1 in 3,500.

R. T. L.

AKAGI (Katsuo). **[On a New Species of Rhabditis, occurring among the Ainos in Hokkaido.]**—*Chugai Iji-Shimpo (Internat. Med. News)*. 1927. Mar. No. 1121. [Summarized in *Japan Med. World*. 1927. July 15. Vol. 7. No. 7. pp. 213-214.]

In 2 out of 82 individuals of the Aino race in Hokkaido, Japan, the author discovered specimens of Rhabditis which are morphologically quite different from other species of this genus which have been described as parasites of man. The author, however, is not clear whether the infections observed by himself were generally parasitic or results of soil contamination.

R. T. L.

- i. COOL (P.). Filariasis in de Molukken. **[Filariasis in the Moluccas.]**—*Geneesk. Tijdschr. v. Nederl.-Indië*. 1927. Vol. 67. No. 2. pp. 314-315.
- ii. SCHIJVESCHUURDER (W.). Over het voorkomen van filariasis op Ceram. **[The Distribution of Filariasis in Ceram.]**—*Ibid.* pp. 316-317.
- iii. ERBER (M.). Bijdrage tot het onderzoek inzake de verspreiding der *Filaria bancrofti* in Celebes. **[The Distribution of Filaria bancrofti in Celebes.]**—*Ibid.* pp. 318-322. With 1 map.
- iv. LICHTENSTEIN (A.). Filaria-onderzoek te Bireuën. **[Filaria Research at Bireuën (Atchin).]**—*Ibid.* No. 5. pp. 742-749. [6 refs.]

- v. BRUG (S. L.). Een nieuwe *Filaria*-soort (*Filaria malayi*), parasiteerende bij den mensch (voorloopige mededeeling). [**A New *Filaria* Species (*Filaria malayi*) parasitizing Man (Preliminary Communication).**—*Ibid.* pp. 750–754. With 6 figs. on 1 plate. [4 refs.]

i. Cool reports upon the distribution of filariasis in the Moluccas. The disease is more or less prevalent on West and North New Guinea (about South N.G. no data are available yet), on the Soela Islands, North Ceram, the South Western and Tenimber Islands. The reports are so far scanty and give only an incomplete idea of the distribution of the disease; further investigation is desirable and possible if medical officers keep notes of it on their regular surveys. The findings largely concern the occurrence of elephantiasis, but in other instances blood samples taken at random showed the presence of the microfilaria of *F. bancrofti* in 10–25 per cent.

ii. On West Ceram (population about 30,000) no filariasis was seen by the author. In the adjacent district of Wahai however, elephantiasis of the legs was noticed in 3 villages near the coast, in 4 out of 300, in 27 out of 130 and in 3 out of 80 inhabitants, respectively. In 25 per cent of these a microfilaria was present in the blood, said to be *M. bancrofti*.

iii. Using BARTO's concentration method, improved by HAGA [this *Bulletin*, Vol. 21, p. 564], for samples taken in daytime, and ordinary thick drops (made from measured quantities of blood) for samples taken at night, a quantitative comparison was made between the number of larvae found in the blood at 11 a.m. and at 11 p.m. in 30 carriers of the worm. The average showed the presence of one microfilaria in the morning against ten at night. The method BARTO-HAGA never failed to show the larvae in daytime, if present at all. Encouraged by this result the author restricted his research to samples taken in the villages in daytime and examined at night.

In the district of Mamodjoe (W. Celebes) the percentage of carriers was found to vary from 7.5–52.9 per cent. (average 24.9). The most heavily infected part of the district was a strip along the coast and rivers. The mountain villages were free. As regards the transmission of the disease Erber remarks that *Aedes amesi*, a mosquito rare elsewhere and fairly common in this district, may play a part. The prevalence of elephantiasis is more or less an indicator of the distribution of filaria. Acute filarial diseases (lymphangitis with fever) were not commonly seen. The occurrence of fever attacks as such is not necessarily related to filariasis since malaria shows approximately the same distribution.

iv. The prevalence of filariasis in Atchin is well known from previous reports. Lichtenstein confirmed their opinion. His attempts to infect the various Culicines, found at Bireuën (*C. fatigans*, *C. sitiens*, *C. gelidus*, *C. vishnui*, *C. bitaeniorhynchus*, *C. whitmorei*, *Aedes fasciatus*, *A. albopictus*, and *Mansonioides uniformis*) yielded only negative results, though 320 mosquitoes were examined. The clinical manifestations of filariasis in Atchin differ from the usual. No acute filarial diseases are seen. Elephantiasis is common, but is always restricted to the lower leg. The clinical sufferers from elephantiasis were never found to harbour the larvae. The distribution of filariasis in the district of Bireuën is an irregular one, which is shown by some figures.

The facts mentioned suggested to the author that the filaria of Bireuën, though showing a typical nocturnal life cycle, might represent a separate species, to be distinguished from *F. bancrofti*.

v. Brug examined the thick drop samples sent by LICHTENSTEIN and actually found a microfilaria, which is to be distinguished from *M. bancrofti*. The difference from the latter (apart from the impossibility of development in *C. fatigans* and many other Culicines) are; (1) the presence of 2 (or 3) scattered nuclei in the point of the tail; and (2) a more forward situation of the anal pore. The adult worm was not examined because much objection exists to post-mortem examinations at Bireuën. Brug proposes the name *Filaria malayi*.

W. J. Bais.

O'CONNOR (F. W.). **Filariasis in Association with Infection of *Filaria bancrofti*.**—*Porto Rico Rev. of Pub. Health & Trop. Med.* 1927. Dec. Vol. 3. No. 6. pp. 211-222.

In Porto Rico 8.9 per cent. of 45 specimens of *Culex fatigans* were found infected with filarial larvae in the boys' dormitory of one of the schools in San Juan, P. R. Attacks of lymphangitis show a periodicity for each individual. The condition usually lasts for 3 to 7 days but in each patient the duration is fairly constant. In 14 cases of hydrocele microfilariae could not be found in the fluid even after centrifugation. In view of the failure up to the present of treatment by intravenous, subcutaneous and intramuscular injections the author suggests an attempt to kill the adult worms by subcutaneous or deep injection below the areas where attacks of lymphangitis are known to begin. He actually mentions tartar emetic in this connexion as possibly more efficacious than by intravenous injection. The second suggestion is careful surgical exploration where local symptoms definitely indicate the position of the adult worm.

R. T. L.

SHARP (N. A. Dyce). **Filariasis in the Cameroon, with Special Reference to Skin Infections by Microfilariae.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1928. Feb. 25. Vol. 21. No. 5. pp. 413-416.

In the Mamfe division of the Cameroons *Filaria bancrofti* is absent or nearly so, but *Loa loa*, *Filaria perstans*, *Onchocerca volvulus* and *Agamofilaria streptocerca* are exceedingly prevalent. *A. streptocerca* embryos occurred in about 40 per cent. of the men and women examined; *O. volvulus* embryos in over 95 per cent. The rate of 6 per cent. given for *Loa loa* refers to 50 cases examined at 9 p.m.

R. T. L.

SHARP (N. A. Dyce). **A Note on *Agamofilaria streptocerca* Macfie and Corson, 1922.**—*Ann. Trop. Med. & Parasit.* 1927. Dec. 31. Vol. 21. No. 4. pp. 415-417. [1 ref.]

Dyce Sharp puts forward three arguments against the view recently expressed in MANSON-BAHR's edition of Manson's Tropical Diseases (1925) that the *Agamofilaria streptocerca* of MACFIE and CORSON 1922, is identical with the embryo of *Onchocerca volvulus*. Not only are the worms morphologically dissimilar, but *S. damnosum*, the vector of *O. volvulus*, is not an efficient vector of *A. streptocerca*.

R. T. L.

SHARP (N. A. Dyce). *Filaria perstans*; its Development in *Culicoides austeni*.—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1928. Feb. 25. Vol. 21. No. 5. pp. 371–396. With 5 text figs, 4 figs. on 1 plate & 1 chart. [38 refs.]

A more formal and detailed description is given of the development of *Filaria perstans* in *Culicoides austeni* briefly announced by Dyce Sharp in 1927 [see this *Bulletin*, Vol. 24, p. 995]. In the Cameroons the incidence of *F. perstans* is not less than 92 per cent. The rarity of infection in white men is due probably to the use of the mosquito net and to the objection of the vector to light. The author's work inculcates *Culicoides grahami* as well as *C. austeni* (with which the bulk of the experimental work was done). Only the female bites and darkness is essential. A lamp giving a quarter of a candlepower of light when placed inside a tent 7 feet long would keep culicoides away. Full moon gave almost complete protection. Black skin proved much more attractive than white. The day to day metamorphosis in the fly is described. The infective larvae emerge from the proboscis on the 7th or 8th day. With experimental feeding 4 to 7 worms usually developed. Of the wild flies at Mamfe over 7 per cent. were infected.

R. T. L.

CARO (Jean). Au sujet de deux cas d'oedèmes de Calabar. [**Two Cases of Calabar Swelling.**]—*Bull. Soc. Path. Exot.* 1927. Dec. 14. Vol. 20. No. 10. pp. 977–979. [Pasteur Inst., Paris.]

The clinical records of two cases are cited in support of the author's contention that the occurrence of Calabar swellings is not definitely correlated either with the migration through the tissues of the adult *Loa loa* or with the discharge of *loa* embryos. He suggests that some toxin or faecal excretion of the worm may be responsible.

R. T. L.

YANO (Ataru). **Findings in the Kidney of the Dog infested with *Filaria immitis* and Experimental Studies on the Toxic Substance of *Filaria immitis*, *Microfilaria* and the Egg. Parts I, II and III.**—*Japan Med. World.* 1927. Sept. 15. Oct. 15 & Nov. 15. Vol. 7. Nos. 9, 10 & 11. pp. 263–266; 292–296; 324–327.

The author is convinced that the entire changes observed in the kidney in infection of dogs with *Filaria immitis* are caused primarily by the toxin circulating through the blood stream. No local or general eosinophilia was observed, although numerous focal infiltrations were found composed of many plasma cells. Clear centrifuged extract of microfilarias in salt solution produced no pathological change in the kidney of mice, but a corresponding extract of adult females induced distinct changes which resemble very closely the changes found in the kidney of filariated dogs.

R. T. L.

SHARP (N. A. Dyce). **A New Site for *Onchocerca volvulus*.**—*Lancet.* 1927. Dec. 17. p. 1290.

In a case with an ulcerated foot, resembling a Lisfranc amputation, which had supplicated for months the hospital dresser extracted piecemeal several inches of a female nematode worm which proved on micro-

scopical examination to be *O. volvulus*. The site occupied would have been in the normal foot below the second and third metatarsal in the fibres of the flexor brevis digitorum.

R. T. L.

HEYDON (G. M.). **Observations on the Larvae of *Onchocerca gibsoni* (Cleland and Johnston) in the Skin of Infected Cattle.**—*Australian Jl. Experim. Biol. & Med. Sci.* 1927. June 16. Vol. 4. Pt. 2. pp. 61-68. With 1 plate. [10 refs.] [Australian Inst. Trop. Med., Townsville.]

Heydon records the presence of the larvae of *Onchocerca* in the superficial layers of the dermis in Queensland cattle having nodules of *Onchocerca gibsoni* in the brisket, the number varying from 15-40 per square millimetre of skin.

R. T. L.

OCHOTERENA (I.). **[Mexican Onchocerciasis.]**—*Rev. Mexicana de Biol. Mexico City.* 1927. May-June. Vol. 7. p. 55. [Summarized in *Jl. Amer. Med. Assoc.* 1927. Sept. 17. Vol. 89. No. 12. p. 1007.]

The tumours caused in Mexico by *onchocerca* are well illustrated. There is nothing, in the opinion of the author, to justify the creation of a new species. They vary according to growth location.

R. T. L.

HOFSTÖTTER (Herbert). Ein weiterer Fall von *Ascaris lumbricoides* in einem Eileiter.—*Wien. Klin. Woch.* 1927. July 7. Vol. 40. No. 27. pp. 878-879. [20 refs.]

JOYEUX (Ch.) & KOBZIEFF (N. I.). **Recherches sur l'*Hymenolepis microstoma* (Dujardin, 1845).**—*Ann. Parasit. Humaine et Comparée.* 1928. Jan. 1. Vol. 6. No. 1. pp. 59-79. With 7 text figs. [30 refs.] [Lab. Parasit., Faculty of Med., Paris.]

JOYEUX (Ch.). La classification des cestodes d'après quelques travaux récents.—*Ann. Parasit. Humaine et Comparée.* 1928. Jan. 1. Vol. 6. No. 1. pp. 132-136. [7 refs.] [Lab. Parasit., Faculty of Med., Paris.]

MAZZA (Salvador). La anquilostomiasis en las provincias del norte argentino.—*Prensa Méd. Argentina.* 1927. Sept. 30. Vol. 14. No. 12. pp. 491-492. [3 refs.] [Also in *Bol. Inst. Clin. Quirúrg.* Buenos Aires. 1927. Vol. 3. No. 21-25. pp. 184-186.]

WALKER (J. H. C.). *Ascaris lumbricoides* in the Singapore Garrison.—*Malayan Med. Jl.* 1927. Dec. Vol. 2. No. 4. pp. 148-150.

TROPICAL OPHTHALMOLOGY:

A REVIEW OF RECENT ARTICLES.—IX.*

THE EYELIDS.—MACRAE¹ has described an operation for entropion which he, at all events, considers superior to all others. WEBSTER taught him the technique in Beyrout. He employs general anaesthesia, and, after clamping the lid, makes an incision on its conjunctival surface parallel to and 3 mm. distant from the lid edge. The incision is carried right through the entire depth of the tarsal plate. Each extremity curves towards the lid margin, but does not actually reach it. The clamp is removed and a moist pad is pressed into the incision to stop the bleeding. A mucous membrane graft is taken from the lip, and this is pressed into the incision once the oozing of blood has ceased. Care must be taken to trim the ends of the graft to a point and to press them well down into the extremities of the wound. No sutures are employed. It is claimed that the operation gives satisfactory results and is followed by no deformity of the lid edge.

CONJUNCTIVA.—PASCHEFF² states that whilst both conjunctivitis necroticans infectiosa and conjunctivitis tularensis cause white spots in the conjunctiva, the causative organism is different. Conjunctivitis necrotica infectiosa is a nodular infectious disease with a tendency to suppuration. The spots are distributed all over the membrane, but are most numerous in the fornices. Conjunctivitis tularensis is accompanied by marked constitutional symptoms and causes caseation in the lymphatic glands; the spots in this disease principally affect the tarsal conjunctiva.

DURAND & LUMBROSO³ argue that Koch-Weeks inflammation of the conjunctiva, especially in trachomatous countries, is by no means so innocuous a disease as is often supposed. The affection may not only in some cases produce a destructive corneal ulceration, but it predisposes to trachoma. Preventive vaccination should, therefore, prove of service. They have prepared a polyvalent vaccine of the bacillus and have experimented with it on school-children. The vaccine had no bad effects of any kind; and only 9.3 per cent. of the vaccinated children were found to harbour the Koch-Weeks bacillus as against 30 per cent. of the unvaccinated.

Spring Catarrh. Narayana RAO⁴ reports from Mysore seven cases of spring catarrh, and concludes that (1) cases are fairly common in the district, (2) adolescent males are the most commonly affected, (3) caustics and operative treatment seem to do no good; but calcium salts and nuclein are useful. Most of his patients showed morbid conditions of the nose and throat, treatment of which seemed to benefit the ocular trouble. Blood examination revealed an eosinophilia in

* For the eighth of this series see Vol. 24, pp. 1011–1021.

- 1 MACRAE (Alex). Webster's Operation for Entropion of the Upper Lid.—*Brit. Jl. Ophthalm.* 1928. Jan. Vol. 12. No. 1. pp. 25–30. [10 refs.]
- 2 PASCHEFF (C.). Differential Diagnosis between Conjunctivitis Necroticans Infectiosa and Conjunctivitis Tularensis.—*Amer. Jl. Ophthalm.* 1927. Oct. Vol. 10. No. 10. pp. 737–744. With 7 text figs. [11 refs.]
- 3 DURAND (Paul) & LUMBROSO (Ugo). Essai pratique de vaccination contre la conjonctivite aiguë à bacilles de Weeks.—*Arch. Inst. Pasteur de Tunis.* 1927. Dec. Vol. 16. No. 4. pp. 365–377. [1 ref.]
- 4 RAO (B. K. Narayana). Conjunctivitis Vernalis or Spring Catarrh of the Conjunctiva. A Study of Seven Cases.—*Indian Med. Gaz.* 1928. Jan. Vol. 63. No. 1. pp. 10–13. [10 refs.]

all the patients. The paper serves a useful purpose as it directs attention to a disease which may be wrongly diagnosed as trachoma by those who have not closely studied diseases of the eye. Applications of irritant, caustic solutions to the conjunctiva may then aggravate the disease and have a disastrous result.

IBRAHIM⁵ (Fahim Girgis) found that the eosinophilia present in patients suffering from constitutional disorders such as ankylostomiasis causes no excess of eosinophiles in their conjunctival discharges provided they are free from spring catarrh. The presence of eosinophile leucocytes in smears taken from the conjunctiva is therefore a valuable diagnostic aid; care must be taken, however, to obtain the smear quite free from any blood.

LUMBROSO⁶ divides those forms of conjunctivitis associated with follicle formation into two groups: (1) The typical forms such as trachoma, follicular, and the natural granular conjunctival inflammation of rabbits and monkeys; and (2) the atypical forms such as swimming-bath conjunctivitis, inclusion conjunctivitis of the newborn, Parinaud's conjunctivitis, and epithelial desquamative conjunctivitis. He considers that nearly all the typical granular inflammations, especially the more follicular, have a telluric origin. Agriculturists, infants (whose habits of crawling, etc., bring them in contact with the earth), and rabbits are all liable to be affected. After a long period of incubation and after many passages through different subjects the virus may become more active.

Trachoma.—NOGUCHI⁷ has furnished further details regarding the isolation of a pathogenic micro-organism from the conjunctiva of trachomatous Albuquerque Indians and has furnished micro-photographs of the lesions produced in the conjunctiva of the inoculated monkeys. His first report has already been referred to⁸ (this *Bulletin*, Vol. 24, p. 1013). The organism grew only on the leptospira medium. It is noteworthy that a pure culture was necessary to induce the disease and that crushed infected conjunctival tissue failed to do so. NOGUCHI states "Whether or not the parasite is related to forms of trachoma other than that occurring in American Indians remains, of course, to be determined by isolation of the micro-organism from cases in other localities, and possibly also by serologic examination."

In discussing the nature and cause of trachoma NICOLLE⁹ remarks on the difficulties connected with the investigation of the disease. Such animals as are suitable for experiment may react by a granular form of ophthalmia to many different varieties of irritant. And they may exhibit no characteristic lesion whilst actually harbouring its virus. He has come to the conclusion that trachoma is not a specific

⁵ IBRAHIM (Fahim Girgis). A Few Hints on Spring Catarrh.—*Bull. Ophthalm. Soc. Egypt*. 1927. Vol. 20. Session 24. pp. 74-78.

⁶ LUMBROSO (Ugo). Relation de certaines conjonctivites granuleuses humaines avec la conjonctivite granuleuse naturelle du lapin.—*Arch. Inst. Pasteur de Tunis*. 1927. Dec. Vol. 16. No. 4. pp. 385-390. [1 ref.]

⁷ NOGUCHI (Hideyo). Experimental Production of a Trachoma-like Condition in Monkeys by Means of a Micro-Organism isolated from American Indian Trachoma.—*Jl. Amer. Med. Assoc.* 1927. Sept. 3. Vol. 89. No. 10. pp. 739-742. With 6 text figs. [Rockefeller Inst. Med. Research, New York.]

⁸ NOGUCHI (Hideyo). Experimental Studies of Trachoma. [Abstract.] *Bull. New York Acad. Med.* 1927. June. Vol. 3. No. 6. pp. 395-399.

⁹ NICOLLE (Charles). Le trachome et les conjonctivites granuleuses. Leur nature. Leur origine.—*Arch. Inst. Pasteur de Tunis*. 1927. Dec. Vol. 16. No. 4. pp. 378-384.

disease of a peculiar type, but is the most disseminated, the most serious, and the best defined clinically of a very numerous group of diseases—the granular inflammations of the conjunctiva. [Many observers in the tropics have already formed a somewhat similar opinion.] He suggests that the soil is the original source of the contagion, and he hopes that the disease may gradually disappear as hygiene improves.

TRAPEZONTZEWA's article¹⁰ shows how extraordinarily deceptive the products of cell degeneration may prove in causing cell-inclusions which may easily be mistaken for micro-organisms. Various forms, the result of ingestion of eosinophile leucocytes and other cells, and of degenerative changes in mucus forming cells, may be found in smears taken from the conjunctiva of the normal rabbit. She describes the changes often found in trachoma when tiny granules, staining red or reddish-violet with Giemsa, appear in the protoplasm of a cell. These granules multiply until the cell becomes swollen and distended. The nucleus, still healthy, is surrounded by a granular mass from which it is separated by a thin layer of blue staining protoplasm. The nucleus eventually degenerates and cell disintegration becomes complete. She has succeeded in producing experimentally almost precisely the same changes in conjunctival epithelium taken from a healthy rabbit. A strip of conjunctiva, taken from a healthy rabbit, was incubated in normal saline solution. No aseptic precautions were observed in order that bacteria of low virulence, normal inhabitants of a rabbit's conjunctiva, might be encouraged to develop. The changes described as peculiar to trachoma occurred in the conjunctival epithelium as soon as the bacteria had had time to multiply. The author is convinced that the degenerative changes found in trachomatous conjunctival epithelium are secondary and are due to the direct action of a virus which is fixed in the adenoid layer of the membrane.

RODRIGUEZ¹¹ advocates a more radical control of the disease in the Philippine Islands than that at present existing. Clinics should be held in every municipality at some time during the school year. McMULLEN's instructions should be distributed gratis to all public institutions. And careful surveys should be made of the different classes in districts which are known to be trachomatous. HOWARD¹² estimates the incidence of trachoma as 20 per cent. in South China and 30 per cent. in North China. He thinks the disease in China has now reached its "saturation point," and that in future, with increased knowledge and with improved hygiene, the prevalence of the disease should diminish gradually. Dust is indirectly responsible for infection since it leads to rubbing of the eyes by fingers which may be infected. He blames "the common towel" for the transmission of the disease. Dissemination of the disease will practically cease once this household article is abolished. In China spontaneous cure often occurs in the early cases, and the virulence of the disease is said to be relatively less than

10 TRAPEZONTZEWA (C.). Des inclusions intracellulaires de l'épithélium conjonctival particulièrement dans le trachome. Quelques réflexions sur leur origine et leur nature.—*Arch. Inst. Pasteur de Tunis*. 1927. Sept. Vol. 16. No. 3. pp. 271–285. With 9 coloured figs. on 1 plate.

11 RODRIGUEZ (Pedro A.). Trachoma Control among the School Children.—*Monthly Bull. Philippine Health Service*. 1927. Feb. Vol. 7. No. 2. pp. 60–67. [8 refs.]

12 HOWARD (Harvey J.). Community Control of Trachoma in China.—*China Med. Jl.* 1927. Sept. Vol. 41. No. 9. pp. 765–769.

in Europe or America. Rubbing with perchloride of mercury solution and boric acid is the treatment recommended. But the author states "marvellously beneficial results are brought about by treatment, even in the simplest forms, e.g., hot water compresses without any other treatment." China is now receptive to propaganda, and skilful use of this would soon cause the disease to diminish. CHAN & OLDT¹³ remark that "too often the incidence rate of trachoma in China [and elsewhere] has been greatly exaggerated because folliculosis and follicular conjunctivitis were called trachoma." A careful examination of 1,602 persons attending a child welfare exhibition at the Y.M.C.A. in Canton indicates a rate of about 15 per cent. of all those examined and about 38 per cent. amongst those affected by eye disease. The writers conclude that (1) the incidence rate in Canton is not over 15 per cent; (2) the importance of correct diagnosis cannot be too strongly emphasized; (3) every endeavour should be made to eradicate trachoma from the schools.

DE PEYRELONGUE¹⁴ has made observations on the disease in Syria. He found it very prevalent but hardly so much so as in Egypt. The florid type of trachoma was noted in 65 per cent. of the cases and the cicatricial type in 25 per cent. Severe outbreaks with secondary infections occur during the hot season. Lack of attention to sanitation is the chief factor in the spread of the disease; and the hot, arid, and windy regions are those most affected. The writer found a tendency to apply too strong caustics when treating the conjunctiva; excessive scarring is a consequence. SAID¹⁵ has much the same report to make. He found the disease common in young children. Defective hygiene and the associated plague of flies are factors in dissemination. The itinerant quack seems to be as mischievous as in other parts of the Orient; he is responsible for blindness due to lagophthalmos following ill-devised operations for entropion and trichiasis. ZACHERT¹⁶ has examined 920 school-children in Tunis and the neighbouring district and found cicatricial changes in the conjunctiva in 37.2 per cent. and complicated trachoma in about 9 per cent. Comparing the disease as seen in Poland with that in Tunis he concludes that in the latter locality (1) it occurs at an earlier age; (2) its development is more rapid and destructive; and (3) the infective agent is much more virulent. He observed many trachomatous children in the clinics who had lost their sight from leucomata or staphylomata. But he adds the important fact that these complications were caused by secondary infections, such as the Koch-Weeks bacillus and Neisser's diplococcus, which are so common in Tunis. The discussion between KOPSTEIN and BOBBERT regarding the prevalence of trachoma in the Dutch East Indies has led BAKKER¹⁷

¹³ CHAN (Y. P.) & OLDT (Frank). Observations on the Findings in 1,602 Eye Examinations for Trachoma.—*China Med. J.* 1927. Dec. Vol. 41. No. 12. pp. 992-998. [2 refs.]

¹⁴ DE PEYRELONGUE. Fréquence, formes cliniques, facteurs étiologiques et distribution géographique du trachome en Syrie et au Liban.—*Rev. Internat. du Trachome*. 1927. Oct. Vol. 4. No. 4. pp. 107-122. With 1 map & 1 chart in text.

¹⁵ SAID (Riza). Le trachome en Syrie.—*Rev. Prat. Malad. des Pays Chauds*. 1927. Nov. Year 6. Vol. 7. No. 11. pp. 547-549.

¹⁶ ZACHERT (M.). Le trachome en Tunisie.—*Arch. Inst. Pasteur de Tunis*. 1927. Dec. Vol. 16. No. 4. pp. 391-396.

¹⁷ BAKKER (C.). Report of an Investigation with Regard to the Eye-Diseases in Amboina.—*Meded. Dienst d. Volksgezondheid in Nederl.-Indië*. 1927. Part 3. pp. 403-456. With 34 curves & 2 maps on 1 plate.

to investigate the question. He found that though trachoma does exist, chiefly amongst adults living under bad hygienic conditions, yet a benign affection of the conjunctiva which resembles follicular trachoma is far more common. This condition is especially prevalent amongst children and requires no isolation, and but little treatment since it tends to undergo a spontaneous cure. He says "In practice the diagnosis trachoma is trifled with so peculiarly, nay, almost criminally, that a warning word is not superfluous."

VISWALINGAM¹⁸ thinks that the incidence of eye diseases in Malaya is increasing with the changing conditions of the country. Immigrants bring their diseases with them and infect the community. Ignorance and poverty lead to a resort to quacks and to delay in seeking treatment.

GALAL ABOUL SEUD¹⁹ has remarked upon the comparative freedom from trachoma enjoyed by the native population of Mecca. People from Nejd, however, who are at present in occupation of the city, are badly affected. The same writer²⁰ thinks that cases of typical trachoma affecting only one eye are not uncommon in Egypt. Ptosis is a constant and early sign, and the follicles are found if the fornix is fully exposed. Tarsal changes and recurrent ulcers of the cornea may occur later in the disease.

DUSSELDORP (Marcelo)²¹ finds that the Provinces of Santiago del Estero, Tucuman, Salta, and Jujuy are heavily infected with trachoma. 70 per cent. of the cases, however, are mild. The disease is most prevalent in the industrial areas, and its spread is favoured by the bad hygienic conditions which exist.

Diagnosis of Trachoma. CANIS²² describes changes at the upper part of the limbus which he thinks are pathognomonic of trachoma. Small yellowish white beads, 1 mm. in diameter, form in a vascularized area at the limbus. The central portion of the bead becomes transparent and the lower portion of the little cup thus formed disappears, so that a regular series of arches arises. The area narrows to a crescentic scalloped edge of opacity. The sites of the beads are marked by small depressions. The author is so convinced of the value of this sign that he makes the rather doubtful statement: "It is more easy and more certain to make the diagnosis of trachoma by examining the limbus than by everting the upper lid." Unfortunately, too often, the diagnosis of trachoma is no simple matter. The greater the experience of the surgeon the less dogmatic on the subject is he likely to be.

Treatment of Trachoma. WORMS (G.) & BIDAULT (R.)²³ report encouraging results from the use of diathermy. They find it necessary

18 VISWALINGAM (A.). Neglect of Common Diseases of the Eyes. Their Results and Treatment.—*Malayan Med. Jl.* 1927. Sept. Vol. 2. No. 3. pp. 93-95.

19 GALAL ABOUL SEUD. Four Weeks Ophthalmic Work in Mecca.—*Bull. Ophthalm. Soc. Egypt.* 1927. Vol. 20. Session 24. pp. 201-202.

20 GALAL ABOUL SEUD. Some Clinical Observations on Monocular Trachoma.—*Bull. Ophthalm. Soc. Egypt.* 1927. Vol. 20. Session 24. pp. 79-81.

21 DUSSELDORP (Marcelo). El tracoma en el norte.—*Bol. Inst. Clin. Quirúrg.* Buenos Aires. 1927. Vol. 3. Nos. 21-25. pp. 253-288. With 2 text figs., 5 graphs and 1 map.

22 CANIS (J.). Les signes cornéens limbiques du trachome.—*Arch. Méd. et Pharm. Milit.* 1928. Jan. Vol. 88. No. 1. pp. 153-156. With 6 text figs. [1 ref.]

23 WORMS (G.) & BIDAULT (R.). Le traitement du trachome par la diathermie.—*Rev. Internat. du Trachome.* 1927. Oct. Vol. 4. No. 4. pp. 122-127.

to induce a very thorough anaesthesia. The electrode is applied for one or two seconds and then reapplied at another point. Altogether 10 or 12 applications are made at a sitting. Intervals of 6 or 8 days are left between the treatments. But still longer intervals are necessary if the reaction set up is at all severe. KALLOCH²⁴ also reports favourable results from the same form of treatment. He pays special attention to the area in the retro-tarsal fold near the caruncle. The cases he treated seem to have been mostly children and young adults who suffered from the follicular variety of the disease.

CORNEA.—Keratomalacia.—HSU²⁵ records ten cases of keratomalacia which occurred in Pekin. The patients presented the usual signs of malnutrition, and some of them suffered from rickets. The author draws the attention of physicians practising in China to the important fact that the diet of nursing mothers, infants, and young children may often be deficient in vitamins. Blood transfusion was employed in the treatment of two of the cases. It seemed to do good, though one of the patients died. SEALE²⁶ reports a case he saw at Grahamstown. The patient was a Kaffir girl aged 8, and was apparently suffering from enteric. Only one eye was affected, and cod liver-oil treatment caused a rapid improvement, both ocular and constitutional. SEALE believes the disease to be uncommon in South Africa.

SOUDAKOFF²⁷ investigated the question of *tattooing leukomata of the cornea* with gold chloride after KNAPP's method. The drug has an acid reaction, and, if used in solutions stronger than 5 per cent., must be carefully neutralized with an alkali. The stain may be darkened by using a reducer such as tannin. The procedure excites but little reaction and is aseptic. The cosmetic results in the cases quoted do not appear to have been better, or as good, as might have been obtained with Indian ink.

LACHRYMAL SAC.—MAGHRABY²⁸ (Abdel Maksoud) states that he has had success in the treatment of *chronic dacryocystitis* by daily injections of liquid paraffin followed by massage. Dilatation of the ducts by probing is commenced once the sac contents have become clear—normally between the 4th and 7th day. The paraffin soothes and lubricates the wall of the sac, and also has a beneficial action on the nasal mucosa.

LENS.—Cataract.—The report by DAVENPORT²⁹ is interesting to surgeons in the tropics as it deals with the after results of the operations

²⁴ KALLOCH (Dudley C.). Treatment of Trachoma by Surgical Diathermy. Preliminary Report.—*Jl. Amer. Med. Assoc.* 1927. Oct. 29. Vol. 89. No. 18. pp. 1511-1513. [Physiotherap. Dept., Near East Relief, Leninakan, Armenia.]

²⁵ HSU (Kang-Liang). Nutritional Keratomalacia. Report of Cases.—*China Med. Jl.* 1927. Oct. Vol. 41. No. 10. pp. 825-836. With 7 figs. & 3 charts. [14 refs.]

²⁶ SEALE (E. A.). A Case of Keratomalacia.—*Jl. Med. Assoc. South Africa.* 1927. Sept. 24. Vol. 1. No. 18. p. 479. [8 refs.]

²⁷ SOUDAKOFF (P. S.). P. Knapp's Method of Tattooing the Cornea.—*China Med. Jl.* 1927. Aug. Vol. 41. No. 8. pp. 723-728. [10 refs.] [Peking Union Med. College, Peking.]

²⁸ MAGHRABY (Abdel Maksoud). Treatment of Chronic Dacryocystitis with Paraffin Injection.—*Bull. Ophthalm. Soc. Egypt.* 1927. Vol. 20. Session 24. pp. 140-141.

²⁹ DAVENPORT (R. C.). The After Results of Cataract Extraction.—*Brit. Jl. Ophthalm.* 1928. Feb. Vol. 12. No. 2. pp. 85-93. [2 refs.]

for senile cataract performed in Moorfields Hospital during the seven years 1919-1925. The average number of operations in a year was 366, and the results of 2,368 in all are analysed. Extraction with peripheral iridectomy was the operation most often performed. Simple extraction was done in 25 per cent. of the cases, but was less frequently employed in the later years. 872 of the patients were between the ages of sixty and seventy, and 580 were between seventy and eighty. Thus more than 60 per cent. were over the age of sixty. 88.4 per cent. obtained a vision of 6-60 or better, whilst 2.5 per cent. were complete failures, and 50 eyes required removal. Suppuration occurred in 20 patients and expulsive haemorrhage in 7 (0.3 per cent.). Iris prolapse occurred in 6.88 per cent. Of these 4.52 per cent. followed complete iridectomy, 5.65 per cent. peripheral iridectomy, and 12.8 per cent. simple extraction. Vitreous loss was recorded in 4.2 per cent. Four cases of sympathetic ophthalmitis were encountered. Needling for after cataract was done on 62.4 per cent. of the patients. Twelve patients died. DAVENPORT states that more immature cataracts are now removed than was customary formerly. Now that the importance of rigid asepsis and of irrigation is more realized this is without doubt a step in the right direction. Compared with Indian practice less trouble from unripe cortex is likely to be experienced in England since in this country the cortical element in the cataractous lens is commonly smaller owing to the older age of the average patient. The routine measures taken in Tirupattur Hospital against infection in cataract extraction are described by GNANADIKAM⁸⁰. Four days before the operation the conjunctiva is swabbed over with 2 per cent. nitrate of silver solution. Subsequent applications of yellow oxide of mercury ointment and of zinc and ichthyol ointment are made. The other steps in technique are similar to those ordinarily employed at most hospitals. The eye is controlled during operation by a suture passed through the superior rectus muscle. Irrigation of the anterior chamber is deprecated. Intra-gluteal injections of 8-10 cc. of cow's milk are employed to treat any post-operative iritis.

DUGGAN⁸¹ has adopted the Green's method of inducing anaesthesia by blocking the ciliary nerves. He uses a 5 cc. syringe with a needle 4 to 4½ cm. long. About 1 cc. of a 2 per cent. solution of novocain, to which is added a few drops of adrenalin chloride, is injected in cataract cases, whilst up to 4 cc. is used when any severe inflammation is present. The needle is entered through the skin at a point near the external canthus and between the margin of the orbit and the edge of the lower lid. It is pushed along the floor of the orbit with an inclination slightly upwards and inwards so as to follow a path between the external and inferior recti muscles. Some fluid is injected, and the direction of the needle is then altered so as to make further injections above and below on the outer side of the optic nerve. The lids are anaesthetized by further injections made subcutaneously above and below the external canthus. At least half an hour should be allowed to pass before commencing the operation. The anaesthesia is stated to last for quite two hours.

⁸⁰ GNANADIKAM (G. Joseph). The Prevention of Infection in Cataract Operations.—*Indian Med. Gaz.* 1927. Nov. Vol. 62. No. 11. pp. 634-636. With 2 text figs. [Swedish Mission Hosp., Tirupatur, Ramnad District, S. India.]

⁸¹ DUGGAN (J. N.). Deep Infiltration Anaesthesia in Ophthalmic Operations.—*Indian Med. Gaz.* 1927. Oct. Vol. 62. No. 10. pp. 558-561.

General Diseases.

Leprosy. VAN DRIEL⁸² from his observation of 550 lepers in Sumatra concludes that (1) blepharochalasis of the upper lid is a common symptom; (2) keratitis punctata superficialis occurs more frequently than in non-lepers; (3) a mild iritis and irido-cyclitis is the most common ocular affection in leprosy; (4) invasion of the tissues by the bacilli takes place along the course of the blood vessels from the deeper structures; (5) extension of the disease from the skin to the eye is rare; (6) total blindness resulting from leprotic infection is comparatively uncommon.

Malaria.—HOLLMANN⁸³ has observed in every case of acute or chronic malaria, quartan or otherwise, which he has examined, retinal changes which he believes are peculiar to malaria. The retinal veins are engorged and dark, and exhibit an irregular reflex made up of angular, strongly refracting, crystalloid particles. This reflex is best marked at points where the vessels branch or cross one another, and is affected by movements of the patient's or the observer's eyes. The arteries are also involved, but in a lesser degree than the veins. The shining particles reminded the author of those seen in sychysis scintillans, but differed in that they were fixed in position. The appearance closely resembles the reflexes so often to be observed in youthful eyes, but these are found adjoining the vessels at the level of the retina, whereas the malarial reflexes are on the vessel wall and may project for some distance into the vitreous. In two boys, aged 11 and 13, the retinal picture was that of a mosaic formed of tiny black, white, and red specks, said to resemble nothing hitherto described in diseases of the retina. One of the boys was partially nightblind. Ten cases showed a peculiar slate-grey coloration in the neighbourhood of the disc. The patches were one and a half to twice disc size and possessed no well-defined border. Confirmation of HOLLMANN's statements would well demonstrate how easily experienced observers may overlook obvious lesions hitherto undescribed; but it must be remembered that retinal appearances very similar to these may result from causes other than malaria.

Miscellaneous.—*Echinococcus of the Orbit.*—HOWARD⁸⁴ reports a case of hydatid of the orbit which he treated in the Pekin Union Medical College Hospital. He suggests that hydatid disease may occur in China more commonly than is generally supposed since conditions there are favourable to its spread. Nevertheless only twelve cases were treated in the Pekin Union Hospital during the ten years 1916–1926. The liver was the part affected in all except the case reported. The eosinophilia was no greater than 3 per cent.

Thelaziasis of the Eyelid.—HOWARD⁸⁵ has described the case of a Canadian missionary in Pekin who infected a papilloma on the skin

⁸² VAN DRIEL (B. M.). Affections of the Eye in Leprosy. [Correspondence.] —*Amer. Jl. Ophthalm.* 1926. Oct. Vol. 9. No. 10. pp. 785–786.

⁸³ HOLLMANN (G. F.). Ueber Veränderungen an den Netzhautgefäßen bei Malaria.—*Arch. f. Schiffs- u. Trop.-Hyg.* 1928. Feb. Vol. 32. No. 2. pp. 82–87. [1 ref.] [German Hosp., Tiflis.]

⁸⁴ HOWARD (Harvey J.). Echinococcus Cyst of the Orbit in a Chinese.—*Amer. Jl. Ophthalm.* 1927. Oct. Vol. 10. No. 10. pp. 727–736. With 5 text figs. [5 refs.]

⁸⁵ HOWARD (Harvey J.). Thelaziasis of the Eye and its Adnexa in Man.—*Amer. Jl. Ophthalm.* 1927. Nov. Vol. 10. No. 11. pp. 807–809. [10 refs.]

of his lower eyelid. The infection came apparently from a pet dog which had died from some helminthic infection of its lungs. It had suffered during its illness from a severe irritation of both eyes. Pathological examination of the papilloma showed larval nematodes present in the invaginations of the growth. These were identified as *Thelazia callipaeda*.

Aspergillosis of the Orbit.—WRIGHT³⁶ has reported two cases of fungating granuloma of the orbit from which he was able to isolate an aspergillus. The first, a male Hindu aged 35, showed a large ulcerating growth of his orbit. The tumour had displaced the eyeball upwards and outwards and had invaded the nasal cavity. The second, a female, presented two small, hard, subcutaneous nodules, the size of large peas, one above and the other below the internal tarsal ligament. Chronic dacryocystitis with complete obstruction was present, and granulomatous changes with marked scarring were found in the upper and posterior portions of the nasal cavity. Sections of the growth in each case showed a vascular granulation tissue studded irregularly with giant cells. Endothelial cells formed the bulk of the framework and polymorphonuclear leucocytes were numerous. The appearance of the tissue suggested a chronic irritation with giant cell formation similar to that occurring in the neighbourhood of a foreign body. Giant cells containing mycelial filaments were observed in sections stained with Leishman's stain, and pure cultures of the fungus were grown from the granuloma. Subcultures were made and described by CORNWALL. He found the aspergillus pathogenic to rabbits, but non-pathogenic to pigeons; and he considered that, whilst it somewhat resembles *Aspergillus flavus*, it is likely to belong to a species hitherto undescribed. The larger tumour was benefited by exposure to X-rays, but the patient left hospital before his treatment was completed. The first case is particularly interesting as the photograph of the patient shows how very closely the granuloma resembled a malignant tumour.

Non-Specific Protein Therapy.—SCARLETT³⁷ writing from a considerable clinical and experimental experience of the use of injections of foreign protein in diseases of the eye, concludes that the treatment is valuable in cases of ocular infection, but it should never be used to the exclusion of the regular routine methods. He found intramuscular injections of 3 cc. of horse serum the most satisfactory form of protein treatment. Any primary cause of the ocular inflammation, such as focal infection, must be eradicated in order to obtain permanent relief. HOWARD³⁸ has found the intravenous injection of typhoid-paratyphoid vaccine efficacious in various diseases of the eye. Iritis, uveitis, exudative choroiditis, and retrobulbar neuritis seem to be the diseases most favourably influenced; but he appears to consider the treatment to be beneficial in almost all diseases. He commences

³⁶ WRIGHT (R. E.). Two Cases of Granuloma invading the Orbit due to an *Aspergillus*.—*Brit. Jl. Ophthalm.* 1927. Nov. Vol. 11. No. 11. pp. 545-559. With 13 text figs.

³⁷ SCARLETT (Hunter W.). Clinical and Experimental Observation on Foreign Protein especially in Iritis.—*Amer. Jl. Ophthalm.* 1927. Oct. Vol. 10. No. 10. pp. 747-750. [7 refs.]

³⁸ HOWARD (Harvey J.). Non-Specific Protein Therapy in Eye Inflammations, with Special Reference to the Use of Typhoid Vaccine.—*China Med. Jl.* 1927. May. Vol. 41. No. 5. pp. 395-407. [17 refs.] [Peking Union Med. College, Peking.]

with 25 million bacilli injected intravenously and doubles each succeeding dose. Modifications are made, however, to suit the individual patient. An interval of 24 hours is left after the temperature has fallen to normal before another injection is administered. The constitutional reaction is usually severe, and no benefit need be expected unless a good reaction is provoked. The temperature may not reach normal until 48 hours, or even longer, after the injection. He prefers milk injections in the treatment of gonorrhoeal ophthalmia. 10 cc. of cow's milk, which has been boiled for 5 minutes, is injected as the first dose. The second and subsequent doses are 15 cc. The injections are made into the gluteal muscles and may prove very painful. Anaphylaxis is guarded against by injecting a drop or two of milk intradermally about half an hour before giving the dose.

Refraction.—In a survey of the refractive errors amongst Filipinos, FERNANDO³⁹ reports that nearly half of all eye cases, seen in private practice, are ametropic. Occupation and ametropia show a fairly close relationship. Thus 4 per cent. of manual labourers, 12 per cent. of young students, and 16 per cent. of older students were found ametropic. Mixed astigmatism, and simple or hypermetropic astigmatism usually caused the most distress. The most marked symptoms were often associated with the slighter errors of refraction, especially in patients exposed to tropical glare or who were subject to malnutrition. High myopia is comparatively rare in the Philippines.

Reports.—The Twelfth and the Thirteenth Annual Reports of the Ophthalmic Section of the Egyptian Government for the years 1924 and 1925 deal with the statistics of eye disease obtained from the impressive total of 429,458 out-patients and 13,841 in-patients treated at the Egyptian ophthalmic institutions. Trachoma and its complications account, as might be expected, for the vast majority of the admissions. One notices a very high incidence of conical cornea (1,761 cases). 6,372 admissions were for primary glaucoma; 7,001 for senile cataract; 552 for soft cataract; and 21 for lamellar cataract.

The fact that only 1,568 spectacles appear to have been ordered throws an interesting side light upon social conditions in Egypt. The very close connexion existing between hot weather and the prevalence of eye diseases in the country is strikingly illustrated by a graph. The gonococcus is said to have been the most common cause of acute ophthalmia. By the addition of a 2 per cent. solution of potassium sulphate to cocaine it has been found possible to obtain satisfactory surface anaesthesia by instillations of 1 per cent. cocaine, and infiltration anaesthesia by injections of $\frac{1}{2}$ per cent. cocaine. This has resulted in a reduction of cocaine consumption by three-quarters and an annual saving of £E.500. The formula of the 1 per cent. cocaine solution is:—

Cocaine hydrochlor....	...	...	0.05 gm.
Adren. chlor. 1-1000	...	...	0.24 cc. (4 drops)
Pot. sulph. 2 per cent. sol....	...	...	1.25 cc.
Carbolic acid 0.5 per cent.	...	...	3.50 cc.

5.04

³⁹ FERNANDO (Antonio S.). Errors of Refraction among Filipinos: a Preliminary Report.—*Jl. Philippine Islands Med. Assoc.* 1927. Sept. Vol. 7. No. 9. pp. 337-341. [5 refs.] [Coll. of Med. Univ. of the Philippines.]

The formula given of the $\frac{1}{2}$ per cent. solution is :—

Cocaine hydrochlor....	...	...	0.05 gm.
Adren. hydrochlor. 1-1000	...	...	1.0 cc. (16 drops)
Pot. sulph. sol. 2 per cent.	...	...	2.5 cc.
Carbolic acid solution 0.5 per cent			6.5 cc.

10.05

A cocaine tablet of 0.05 gm. is first dissolved in the measured quantity of carbolic acid solution ; to this is added the potassium sulphate solution, and, when *quite cool* the adrenalin solution.

H. Kirkpatrick.

MISCELLANEOUS.

SANFORD (Arthur H.). **A Photographic Method of Counting Blood Cells.**—*Jl. Lab. & Clin. Med.* 1927. Feb. Vol. 12. No. 5. pp. 456-460. With 5 text figs. [5 refs.]

The apparatus consists of a projection microscope and ordinary camera. With camera extension of 15 in., total distance from stage to the back of the camera of 24 in., a $\times 6$ eyepiece and 8 mm. objective, a good field was obtained of more than 100 small squares of the counting chamber, at a magnification of about 200. Negatives were made on process films and an exposure of two seconds was found to be the optimum. It is desirable to perforate every blood corpuscle in the process of counting it, and for this purpose a pointed stylus, connected with an electromagnetic counting device, was used. Thus there is obtained a permanent record of the blood count, while the counting itself is done mechanically. The counts obtained in this way show rather larger numbers than by the ordinary method, which is probably due to the fact that out-of-focus cells are apt to be left out.

W. F. Harvey.

COENAES (J.). Over Giemsa-kleuring van bloedpraeparaten. [**Giemsa Staining of Blood Preparations.**]—*Nederl. Tijdschr. v. Geneesk.* 1927. Nov. 5. 71st Year. 2nd Half. No. 19. pp. 1934-1938.

Giemsa staining requires careful attention to details. It necessitates scrupulous cleanliness in the preservation of the stock solution and in everything which is used in the course of staining. Temperature is another of the factors which contributes to success or failure. If the stock solution is kept for a long time in the cold, precipitation occurs. It should be kept at room temperature. The components of the Giemsa stain require that the methyl alcohol content should remain constant and precautions must be taken accordingly to keep the bottle well stoppered and to open it only for the shortest time possible. Methyl alcohol is not only volatile but hygroscopic. But most important of all is neutrality of reaction, if correct staining is to be obtained and decolorization avoided. This applies also to the distilled water used for washing away the stain. In washing away the stain the slide should not be removed from the glass rods on which it has rested while staining. It should be kept in position and in this way there will be no danger of deposit settling upon the film and becoming firmly attached to it. To ensure maintenance of the optimum neutral reaction throughout all the operations the diluent for the stain and the water for washing away the stain should be made up with well-buffered phosphate solutions of pH between 6.8 and 7.1. With such precautions a good result may be ensured.

W. F. Harvey.

BARLOVATZ. Les petits grossissements en microscopie pratique. [**Low Magnifications in Microscope Practice.**]—*Bull. Soc. Path. Exot.* 1927. Oct. 12. Vol. 20. No. 8. pp. 753-758. [Agric. Colonization Soc., Mayumba, Fr. Eq. Afr.]

Emphasis is laid upon the time saved in examination by the use of low magnifications. For stools, the ova of helminths such as of

Ankylostoma, Ascaris, Bilharzia, etc., require only 50 diameters; filariae in fresh blood 80; intestinal protozoa with their special refractility, motile flagellates with their movement, amoebic cysts as brilliant spheres and large bacilli about 125; malarial parasites in thick drop preparations, if well stained, 225; trypanosomes in lymphatic gland fluid 225 or 450. Trypanosomes disappear rapidly and if not seen within 20 to 25 minutes would be better examined for by repeating the gland puncture. Lymphocytes may be distinguished and counted in a fresh preparation of cerebrospinal fluid at a magnification of 125 to 130.

W. F. Harvey.

BATES (Lewis B.) & AVERY (Samuel D.). **Hemorrhagic Bronchopneumonia resembling Pneumonic Plague due to a Bacillus of the *B. mucosus capsulatus* Group.**—*Proc. Med. Assoc. Isthmian Canal Zone*. 1921-1926. Vol. 14. pp. 95-98.

The case was one of a coloured male, who had been on the Isthmus for 15 years. He suffered from diarrhoea and weakness of 3 to 4 days duration and died 20 hours after admission to hospital. Only the lungs presented outstanding features at autopsy, in the shape of scattered haemorrhagic areas. Direct smears showed gram-negative cocci and diplococci or diplobacilli. The organism isolated fermented glucose, lactose, mannite and saccharose with gas formation and was identified as *B. mucosus capsulatus*. Two mice inoculated intraperitoneally and a guineapig subcutaneously died and the organism was isolated from the heart blood.

W. F. Harvey.

KINGSBURY (A. Neave). **Dried Complement in the Tropics.** [Correspondence.]—*Brit. Med. J.* 1927. Sept. 17. p. 518.

It would render possible the performance of the Wassermann test in many small laboratories and in laboratories where guineapigs are not easily procurable, if the complement could, like the amboceptor, be obtained in dried form. The writer has tried such a preparation, but found that the solution given was turbid and required filtering. The strength of the solution was not up to the requirements of the test. Thus the necessary amount (2.5 M.H.D.) was contained in 0.5 cc. of a 1-10 dilution of the reconstituted serum, which is too low a dilution to be safely used. [The sample may have undergone change and ought ordinarily to have dissolved to give a clear solution. Some method of preparing ones own complementing serum, as possibly by freezing with carbon dioxide snow, pulverizing and drying absolutely and rapidly at low temperature, might furnish a satisfactory preparation.]

W. F. Harvey.

PRZESMYCKI (F.). Badanie nad biochemjja antygenów. Analyse des éléments antigènes des bacilles typhiques, paratyphiques et dysentériques. [**Antigens of Typhoid, Paratyphoid and Dysentery Bacilli.**]—*Medycyna Doświadczalna i Społeczna*. Warsaw. 1927. Vol. 7. No. 3-4. pp. 260-272. French Summary pp. 273-274. [1 ref.]

It has been possible to show for the lipoids of these organisms, as was shown for the bacilli $X_{10}H$ and $X_{10}O$, that they are not differentiated from one another. Immunization with bacterial lipoids may

even give rise in some cases to antibodies for animal lipoids, but this depends on the animal used for the purpose. If rabbits have been immunized by the lipoids without addition of serum, deviation of complement is given only in dilution 1-20 to 1-80, and with the addition of serum in dilution 1-320, which shows that the antibodies have rather the character of haptenes. Such immunization with lipoids does not give rise to antibodies for the whole bacilli. Polysaccharides, giving precipitation with antityphoid serum in a dilution of 1-5,000, have been extracted from typhoid bacilli, but not from paratyphoid A and B.

W. F. Harvey.

BRAUN (H.) & GOLDSCHMIDT (R.). Die Brutschrankluft als Stickstoff- bzw. Kohlenstoffquelle für Typhus-, Paratyphus B-, Shiga-Kruse- und Coli-Bazillen. [**Air of the Incubator as a Source of Nitrogen or Carbon.**]-*Cent. f. Bakt.* I. Abt. Orig. 1927. Jan. 3. Vol. 101. No. 4-5. pp. 283-290. [11 refs.]

In experiments on the exact metabolic requirements of organisms it is essential to exclude the possibility that the air of the incubator might prove a source of nitrogen or of carbon. That some organisms can make use of this source has already been shown.

In this research the following media were used: (1) nitrogen free,—sod. sulphate 0.5: mag. sulphate 0.005: dihydrogen pot. phosphate 0.05: dipot. phosphate 0.15: sod. lactate 0.5: twice distilled water 100, and (2) carbon free,—ammon. chloride 0.5: sod. sulphate 0.5: mag. sulphate 0.005: dihydrogen pot. phosphate 0.05: dipot. phosphate 0.15: twice distilled water 100.

Organisms of the typhoid-paratyphoid-coli-dysentery group can gradually utilize the incubator air as a source of nitrogen, and in the case of *B. coli* it can also serve as the source of carbon. If this source of error is to be eliminated culture flasks must be sealed after sowing and before being incubated.

W. F. Harvey.

RIDING (D.). **Pyelitis from Infection with Morgan's No. 1 Bacillus.**—*Brit. Med. J.* 1927. Jan. 29. pp. 183-184.

The infection is described as occurring in two cases at Khartum. In the first Morgan's No. 1 bacillus was obtained from the urine in pure culture and the patient's serum agglutinated his own organism up to a dilution of 1 in 500 in an hour. The second case was not quite so definite, for a few *B. coli* colonies were also present.

W. F. Harvey.

SANARELLI (G.). Origine commune des spirochètes et des bacilles fusiformes. [**Common Origin of Spirochaetes and Fusiform Bacilli.**]-*C.R. Soc. Biol.* 1927. May 6. Vol. 96. No. 14. pp. 1136-1139.

The author has kept an intestinal spirochaete for more than a year in pure culture on agar, containing fragments of kidney tissue. If

it is transferred to nutrient bouillon, there is no growth, but let it be transferred along with *B. mesentericus* and both organisms develop freely. This favouring action of *B. mesentericus* is shown to be due to a thermolabile substance and is exhibited even by a bacterial-free filtrate. In such a *mesentericus* filtrate, however, the spirochaetes in time take on the appearance of typical fusiform bacilli. In one case this fusiform strain became fixed culturally. It tended to return, however, to the original spirochaetal form with passage through the guineapig. Agglutinating sera prepared with spirochaetal cultures agglutinated the fusiform strain to full titre, thus showing that antigenically the two strains were identical. Both cultures showed transformation almost completely into coccoid bodies by the 4th day. The fusiform bacilli, which developed on subculture from these coccoid bodies, were very short and very motile; they became transformed into filaments, ribbon-like and slow of movement. Some of these showed a certain amount of twist upon their axis, giving the filament a helicoidal appearance. The twists became, with increasing length of the organism, more pronounced and even more numerous. Later still transverse division occurred at the places of torsion, accompanied by tapering elongation as the organisms separated from one another. And thus were produced characteristic fusiform bacilli. The conclusion is drawn that fusiform bacilli are only spirochaetes which, under the action of the metabolic products of associated bacteria, prolonged contact with atmospheric oxygen and such influences, have lost more or less completely the power of effecting complete and multiple torsion on their own axis. This may explain why fusiform bacilli are found along with other bacteria and more superficially than the deeply placed anaerobic spirochaetes.

W. F. Harvey.

LISTON (W. Glen). **Introductory Remarks on a Discussion on Vaccine Therapy.**—*Edinburgh Med. Jl.* 1927. June. Vol. 34. No. 6. Trans. Med.-Chirurg. Soc. pp. 101–108.

In the case of vaccine therapy as distinguished from vaccino-prophylaxis most of the evidence for satisfactory result has to be obtained from the users of the vaccines. Comparatively little experimentation in animals has been done on post-infectious immunization. Col. Liston strongly emphasized the need for co-operation between the practitioner and the bacteriologist, as also did most of those who took part in the subsequent discussion. A very moderately worded presentation of the subject of vaccine therapy is here given and cautionary advice offered upon its fundamental principles:—

(1) A vaccine must be made from the particular species of microbe causing the disease and in such a way as to produce maximum antigenic or immunizing effect; (2) the dose of vaccine used for the treatment of disease is a question of very vital importance and it should be in inverse proportion to the severity of the infection. It is a good practice to begin with a small dose and increase more or less rapidly, as may be indicated by the response to the inoculation, till a suitable dose has been attained; (3) every effort must be made to get the immune substances circulating in the blood into intimate contact with the infecting germs, as by opening up undrained cavities, etc.; (4) vaccines

are limited in their field of application and can be most successfully applied to (a) the prevention of disease, (b) the treatment of localized infections, and (c) treatment of the earlier stages of acute infections.

W. F. Harvey.

BESREDKA (A.). De la vaccination par voie buccale contre la dysenterie, la fièvre typhoïde et le choléra. [**Oral Vaccination against Dysentery, Typhoid and Cholera.**—*Rev. d' Hyg. et de Méd. Préventive*. 1927. June. Vol. 49. No. 6. pp. 445-463.]

The author begins with an enunciation of his well-known views on local immunity. Vaccines against dysentery, typhoid and cholera administered subcutaneously are efficacious not because they give rise to antibodies, but because, when they have arrived at their selective destination, the intestine, they are absorbed by receptive cells and give rise to a local immunization. This applies to both living and dead vaccines. If this is the mode of immunization, it would seem preferable to practise entero-vaccination more directly. According to Besredka's experiments in animals, oral immunization can give rise to immunity in 3 days, which is too short a time for the production of antibodies. Antibodies, however, may often be found in the blood after the first oral administration of dysentery vaccine and represent, no doubt, a response to the parenteral introduction of antigen through erosions produced by the action of the vaccine itself. These erosions heal up quickly, and the intestine, which has become immunized, is then no longer subject to erosion. Thus there comes about the phenomenon that subsequent administration of vaccines *per os* gives rise to a more and more solid immunity, but at the same time the antibodies of the blood diminish or disappear. That is to say, we are dealing in reality with a local and not general immunity. A striking trial of the method of oral immunization is reported by NICOLLE and CONSEIL. Two volunteers were given killed Shiga vaccine by the mouth for 3 consecutive days. On the 15th and 18th day after, they swallowed ten thousand million living virulent Shiga bacilli; the same dose was given to two other unvaccinated persons. Both the unvaccinated contracted Shiga dysentery, whilst the vaccinated did not suffer at all. Some statistics are given of the use of dysentery vaccine by the mouth, both prophylactic and curative.

In the case of typhoid and cholera large quantities of these organisms may be ingested without the slightest effect upon the animal. And yet the intestine is the seat of election for the action of these organisms. If the thick coat of mucus, which protects the intestine, be removed by the administration of bile the truly sensitive cells are exposed and a comparatively small dose of typhoid or cholera bacilli by the mouth will then produce infection and death. This affinity for and localization of the organisms to the intestine does not apply merely to ingested bacilli but also to bacilli injected subcutaneously, intraperitoneally or intravenously. In each case the virus arrives at the intestinal mucosa. If then the infection is essentially intestinal, to the exclusion of other organs, it is the intestine in particular which requires protection. And again, the use of bile, as a means of laying bare the sensitive cells requiring immunization, is indicated. This method of vaccination has been already carried out extensively both for typhoid and cholera.

Besredka concludes: Laboratory experiments and trials in man show that vaccination *per os* is effective prophylactically, and curatively, in the treatment of dysentery, typhoid and cholera.

W. F. Harvey.

SCHLIEF (Carl). Schwierigkeiten und Irrtümer bei der bakteriologischen Typhus-, Paratyphus- und Ruhrdiagnose. [**Difficulties and Errors in the Bacteriological Diagnosis of Typhoid, Paratyphoid and Dysentery.**].—*Muench. Med. Woch.* 1927. June 10. Vol. 74. No. 23. pp. 970-972. [1 ref.]

The author describes the well-known technique for the identification of organisms of the typho-coli-dysentery group. He emphasizes the difficulty of isolation of the pathogenic forms from faecally contaminated water and insists on the necessity for submission of satisfactory faecal samples for test—portions, for example, which contain blood and flakes of mucus. The usual motility tests, fermentation reactions with coloured solid or liquid media, serum reactions with high titre sera and with the patient's own serum, are described. Some of the laboratory difficulties relating to late lactose fermenters, so-called *para-coli* strains and the so-called paraagglutination phenomenon are referred to. In the case of dysentery organisms the necessity for omission of crystal violet from the common selective medium for typhoid-paratyphoid organisms is commented on, as is also the variation occurring in the mannite-fermenting pseudodysentery group.

W. F. Harvey.

LOMRY & GILLET. Sur l'identification des bacilles pathogènes de l'intestin. [**Identification of the Pathogenic Intestinal Bacilli.**].—*Ann. Inst. Pasteur.* 1927. June. Vol. 41. No. 6. pp. 648-667. [53 refs.]

The authors deal with the still undecided question of the differentiation of organisms of the typho-coli-dysentery group without, however, entering upon the further question of the dissociation of organisms of one species into agglutinable, inagglutinable and spontaneously agglutinable races. They consider the matter from the point of view of differentiation of species by means of sugar reactions and agglutination. One hundred and thirty strains were investigated, of which 13 showed themselves abnormal in regard to the reactions employed.

As regards the fermentation of sugars, it may be necessary to make daily subcultures for a considerable time in a selective medium before deciding on the rejection of an organism from a given species. It is also necessary to make certain of the derivation of the organism from a pure colony. With these precautions and with identical conditions throughout, it is largely possible to decide whether a test bacillus is a specific entity or not. The sugars used were glucose, saccharose, mannite, sorbite, xylose and lactose, with the addition of nutrient gelatin (for liquefaction) and neutral red agar (for gas). The *Medical Research Council Report* No. 51, 1920, is here referred to. After this the agglutination test supplied confirmatory proof. In particular

the ordinary absorption test was found most useful, depending, as it does, on the principle that an immune serum saturated with heterologous bacilli is only deprived of its coagglutinins, whereas if it is saturated with homologous bacilli it loses both agglutinins and co-agglutinins. For saturation purposes it was necessary to exclude autoagglutinable and inagglutinable organisms and to have sera of standard strength. With this test and the preceding sugar test, the typhoid-paratyphoid group has been separated into typhoid, paratyphoid A, and paratyphoids B1, B2, B3. The B1 is the normal paratyphoid of Schottmüller. Among the organisms designated B2 are, with others, the Aerttrycke bacillus and paratyphoid C bacillus, while in the B3 group are found the Gaertner bacillus, *B. suispestifer* and the bacillus of mouse typhoid.

After these tests were carried out there still remained a few aberrant organisms which did not allow of definite classification. If after daily subculture for a long period, such organisms prove to be neither agglutinable nor agglutinogenic, nor autoagglutinable, they may safely be regarded as not belonging to any of the known species.

W. F. Harvey.

ARINKIN (M.). Degenerative Veränderungen der Kernigkeit der Granulocyten, welche parasitenähnliche Bildungen simulieren. [**Parasite-like Degeneration of the Granules of Leucocytes.**]—*Rev. Microbiol. et Epidémiol.* 1927. Vol. 6. No. 1. German summary p. 135. [In Russian pp. 99–100.]

Ring, signet ring and pear shaped forms, met with in blood films may, according to the author, be derived from degenerations of the granules of leucocytes and may simulate various parasites such as kala azar, etc.

W. F. Harvey.

BAILEY (Basil N. V.). **Some Preliminary Notes on Bright's Disease in British Guiana.**—*Davson Centenary Fund British Guiana. Theses submitted for the Award of the Gold and Silver Medals for the Triennial Period 1923–1926.* 34 pp. [n.d.] Printed by Waterlow & Sons, Ltd., London.

This thesis gives the incomplete results of an enquiry into the causes of Bright's disease in British Guiana. The author informs us that this malady is responsible for more deaths in the Colony than any other single disease, and that over thirty years ago DAVIDSON regarded the discovery of a healthy kidney at an autopsy as a notable event. Scarlet fever cannot be held responsible for the prevalence of nephritis amongst children, for this acute fever is very rare, though it exists and the author records one case with typical manifestations of the disease, complicated by otitis media, and later, by nephritis. Phthisis and syphilis are usually incriminated locally as main factors in the causation of nephritis, but it is pointed out that the deaths from nephritis, far from falling, have actually increased in spite of vastly improved methods of treatment, and a larger number of cures, of these supposedly causal diseases.

The author believes that acute nephritis is of streptococcal origin, and that staphylococci with their continued irritation of a moderate

virulence give rise to large white kidney, while prolonged toxæmia of a low virulence terminates in the production of contracted kidney. Of these varieties, his studies were restricted to chronic parenchymatous nephritis, but, as he himself admits, the bacteriological findings are invalidated in large measure by the difficulties of obtaining uncontaminated material for examination. He argues that the source of the bacterial infections leading to an ultimate nephritis, is grossly contaminated drinking water, and in support of his contention points out that in Georgetown, unlike the rest of the Colony, the deaths from nephritis have fallen by nearly 50 per cent. in the past few years. The inhabitants of Georgetown, he says, have learnt and are learning to boil their drinking water, or have other means of purification provided, and so make use of supplies which are "at least cleaner than trench water." To this improvement is attributed the localized fall in mortality from kidney disease.

The investigations originally planned were interrupted by illness, and some essential parts of the theories put forward have not been submitted to proof, so that in the thesis, as it stands, evidence and supposition have something of the relative proportions of the bread and sack in Falstaff's tavern bill. None the less, the author deserves well of the Colony for having initiated an enquiry, seemingly long overdue, which must in the end benefit the health of the community.

W. P. MacArthur.

PANTSCHENKOW (M. M.) & KIRSTNER (A. A.). Die quantitative Bestimmung des Chinins im Blute. [**The Quantitative Estimation of Quinine in Blood.**]*—Arch. f. Schiffs- u. Trop.-Hyg.* 1928. Mar. Vol. 32. No. 3. pp. 137-140. With 1 coloured text fig. [15 refs.] [I. Med. Clinic, I. State Univ., Moscow.]

The methods hitherto adopted for the estimation of quinine in blood, depending on the extraction of the quinine and its estimation by means of precipitants, are regarded by the authors as liable to error owing to the difficulty of removing the alkaloid from associated protein and the low concentration of quinine in blood. Their method consists in mixing 10 cc. of blood drawn from the median basilic vein at a desired time (3, 6 or 9 hours after administration of the drug) with sufficient dry sodium bicarbonate contained in an Erlenmeyer flask, and drying the mixture on the water-bath, with frequent stirring until the particles are no longer sticky. The mass is then transferred to a porcelain dish and any lumps rubbed down to a powder, which is again transferred to the flask. It is then extracted with ether three times using 100 cc. each time and allowing each lot of ether to remain on the mixture with occasional shaking for 24 hours. This part of the process may be expedited by extracting with ether for 24 hours in a Soxhlet extractor. The filtered ethereal extract is then evaporated to dryness, with the usual precautions to avoid fire or explosion and the residue dissolved in 1 to 2 cc. of dilute sulphuric acid. This solution is transferred to a test tube, made of non-fluorescent glass, and examined in ultra violet light, alongside a standard solution of quinine bisulphate, preferably in a dark room. The lamp should be run for 5 minutes before making a comparison. With the lamp used by the authors, 1 in 2,000,000 of quinine bisulphate showed a distinct bright

blue fluorescence. Quinidine can also be estimated by this process. The method shows that the erythrocytes contain more quinine than serum.

T. A. Henry.

KROÓ (H.) & MANO (Y.). Ueber die Bedingungen optimaler chemotherapeutischer Wirkung. Abhängigkeit der Wirkung von der Konzentration der Heilmittel. [**Conditions for Optimal Chemotherapeutic Effect. Dependence of Efficacy upon Concentration of Drug.**—*Deut. Med. Woch.* 1927. Apr. 8. Vol. 53. No. 15. pp. 603-605. [5 refs.] ["Robert Koch" Inst., Berlin.]

— & SCHULZE (F. O.). Ueber die Bedingungen optimaler chemotherapeutischer Wirkung. Ergebnisse am Menschen. [**Conditions for Optimal Chemotherapeutic Effect. Results with Man.**—*Ibid.* Oct. 14. No. 42. pp. 1759-1760. [1 ref.] ["Robert Koch" Inst., Berlin.]

Contrary to the commonly accepted view that for the sterilization of an infected animal a certain minimum dose of a drug specifically active against the infection is required, the authors find that the therapeutic value of a dose of any particular drug may depend in large measure on its concentration in the solution in which it is administered. Thus it was found that in mice infected experimentally with recurrent fever, the dose of neosalvarsan which cured all the mice was 3·3 mgm. in 1 cc. water, the same dose in 0·25 cc. and 0·1 cc. water giving only 85·6 and 57·1 per cent. of cures respectively. Similar results were obtained with salvarsan and a complex gold compound "Solganal." Similarly mice experimentally infected with nagana responded better to doses of 0·02 to 0·1 mgm. of neosalvarsan in 1 cc. of water than to the same doses in 0·1 cc. of water. With trypanflavin, the only dyestuff it was possible to try, no such dependence of the therapeutic effect on concentration of the solution could be detected. With two antimony compounds, tartar emetic and "antimosan," dilution either had no effect or lowered the therapeutic efficiency, which in the case of "antimosan" was much higher at 1 mgm. in 0·1 cc. than at 1 mgm. in 1 cc. of water.

The explanation suggested for these differences between arsenical and antimonial derivatives is that oxidation takes place more readily in dilute than in concentrated solutions. The immediate oxidation products are highly trypanocidal in the case of salvarsan, but not in the case of the two antimony compounds used.

In the second paper the results are given of the use of quinine hydrochloride (with ethylurethane) by intravenous injection in the treatment of paralytics infected with malaria. One series of 20 patients was given 0·2 gram of the drug in 0·9 cc. water, and another 20 the same amount in 200 cc. water. The first series experienced on the average 4·3 fever-free days against 11 in the second series and in one week 20 per cent. of the first group were fever-free against 80 per cent. in the second.

In a second investigation two pairs of groups of five patients each were treated with 0·3 gm. neosalvarsan dissolved in 1 or 300 cc. water for one pair and with 0·15 gm. neosalvarsan in 1 or 200 cc. for the second pair. Here, again, the results were in favour of the two dilute solutions and were worst for the group receiving 0·15 gm. in 1 cc., and best for that receiving 0·3 gm. in 300 cc.

T. A. Henry.

LEVADITI (C.) & LONGINESCO (J.). Les rapports entre l'activité spirillicide et trypanocide des éléments et leur classification électrochimique. [**Relation between the Spirillicidal and Trypanocidal Activity of Elements and their Electrochemical Classification.**] —*C.R. Acad. Sci.* 1927. July 4. Vol. 185. No. 1. pp. 91-92. [1 ref.]

The authors point out that the elements gold, mercury, vanadium, arsenic, antimony, bismuth, tellurium and platinum, whose compounds have been shown to possess some therapeutic value in syphilis and trypanosomiasis, have in general a polarization tension below that of hydrogen, do not decompose water at atmospheric temperature and are precipitated as sulphides by sulphuretted hydrogen. It is suggested that the formation from these metals in the tissues of spirillicidal compounds such as "bismoxyl" and "trypanotoxyl" depends upon these properties, but the latter may also be exhibited by some elements, e.g., copper and palladium, which are inactive in these two diseases.

T. A. Henry.

PAPAMARKU (P.). Serologische Erfahrungen in den Tropen (Java). [**Serological Experiences in Java.**]—*Ztschr. f. Hyg. u. Infektionskr.* 1927. July 25. Vol. 107. No. 3-4. pp. 755-780. [9 refs.]

In this paper, which cannot usefully be summarized, the author records fully his interesting and valuable work in Java, in the preparation and testing of antisera against tetanus toxin, snake venoms, diphtheria toxin and dysentery bacilli. The best anti-dysentery serum was obtained by injecting the horse first with killed and later with living bacilli.

H. M. Hanschell.

LANDSTEINER (K.) & VAN DER SCHEER (J.). **Experiments on the Production of Wassermann Reagents by Means of Trypanosomes.**—*Jl. Experim. Med.* 1927. Mar. 1. Vol. 45. No. 3. pp. 465-482. [21 refs.]

The discoverers of the Wassermann reaction held, from analogy, that the reaction was caused by antibodies specific for the infecting microbes—a view abandoned when it was shown that syphilitic sera react with alcoholic extracts of organs, presumably with lipoids present in these extracts. In this paper the author gives full details of a careful experimental enquiry into the Wassermann reaction following the injection into rabbits of killed *Trypanosoma equiperdum*. It is known that positive Wassermann reactions prevail in trypanosomiasis of rabbits, similar to those in syphilis. It was found that the trypanosomes were highly active antigens, sufficing in themselves to produce strongly positive Wassermann sera, in analogy to the findings reported by F. KLOPSTOCK with *Treponema pallidum*. It appears likely that this antigenic activity of the microbes or their products plays a part in the production of the Wassermann reagents in infections with spirochaetes and trypanosomes.

H. M. Hanschell.

SISON (A. B. M.) & IGNACIO (M.). **Observations on Basal Metabolism among Filipinos.**—*Jl. Philippine Islands Med. Assoc.* 1927. Nov. Vol. 7. No. 11. pp. 416-419. [1 ref.]

The determinations are mainly concerned with cases of disease and the chief result is that the basal rate is increased in toxic goitre, and in two of the cases it lessened after surgical intervention. The thyroid is regarded as functionally concerned in regulating basal metabolism. Data are given for other diseases, but only for one case in each disease.

W. D. Halliburton.

FLEMING (Wm. D.). **Blood Chemistry and Blood Pressure Standards. I. The Effect of Tropical Residence on the Blood Chemistry and the Blood Pressure.**—*Jl. Metabolic Res.* Morristown, N.J., U.S.A. 1924. Vol. 6. pp. 87-121. With 18 charts. [20 refs.] [Lab. U.S. Army Med. Dept. Res. Board, Bureau of Science, Manila, P.I.]

Data are presented for 500 American and 590 Filipino soldiers. Neither the chemistry nor the pressure is affected by length of stay in the tropics. The systolic blood pressure in Manila averaged 10 mm. lower than in temperate zones and 5 mm. lower for the Filipinos. This is due to decreased peripheral resistance. Moreover, pressure is greater with advanced age. More work is necessary on blood-chemistry.

W. D. Halliburton.

JACOB (J. E.) & McLAVY (J. R.). **Studies in the Chemistry of the Blood. Some Normal Values of Blood Sugar in the Tropics.**—*Proc. Med. Assoc. Isthmian Canal Zone.* 1921-1926. Vol. 14. pp. 71-76.

The figures recorded are higher than those reported by others. Emotion was excluded. In one case 160 mgm. per 100 cc. blood is given, but it is dangerous to draw conclusions from one observation, and consideration of the glucose curve after ingestion of glucose showed that the case was not diabetic.

W. D. Halliburton.

COX (Wesley C.) & JACOB (James E.). **Preliminary Report on Investigation of Sugar Content of Human Blood in the Tropics with Special Reference to the Canal Zone.**—*Proc. Med. Assoc. Isthmian Canal Zone.* 1921-1926. Vol. 14. pp. 77-83.

Observations were made on one person only for about 4 months. The authors could not find that a tropical climate has any effect on the percentage of sugar in the blood. More work is suggested on their subject.

W. D. Halliburton.

NEWHAM (H. B.). **The Sedimentation-Rate of Erythrocytes in Certain Tropical Diseases.**—*Quarterly Jl. Med.* 1927. July. Vol. 20. No. 80. pp. 371-382. With 14 charts. [18 refs.]

The tropical diseases in which the sedimentation rate was studied were, sprue (3 cases), amoebic liver abscess (1), amoebic dysentery (6),

kala azar (4), subtertian malaria (2), tertian malaria (3), granuloma venereum (1), leprosy (1). All, with the exception of the case of granuloma venereum, 4 cases of amoebic dysentery and the case of leprosy showed a rate of sedimentation considerably in excess of the normal. Charts illustrate the rate. Details are given of technique and the subject is discussed in its many bearings. Dr. Newham's conclusions are as follows:—

" 1. The rate of sedimentation of red-blood corpuscles varies markedly in a great variety of disease conditions.

" 2. Little value can be placed on the sedimentation-test as an aid in differential diagnosis.

" 3. It would appear that in all cases showing increased rapidity of sedimentation there is some concomitant derangement of the liver.

" 4. Rapid sedimentation is not dependent in any way on the particular blood group to which the blood belongs.

" 5. Rapid sedimentation appears to occur in any disease condition associated with anaemia.

" 6. The cause of the phenomenon does not appear to reside in an increased proportion of fibrinogen in the blood.

" 7. The property of rapid sedimentation seems to reside in some property of the corpuscles rather than in any particular property of the plasma.

" 8. It is probable that the phenomenon of rapid sedimentation is due to a combination of both physical and chemical changes."

A. G. B.

FOSTER (John H.). **Blood Pressure of Foreigners in China.**—*Arch. Intern. Med.* 1927. July 15. Vol. 40. No. 1. pp. 38–45. With 1 chart. [12 refs.] [Hunan-Yale Hosp., Changsha, China.]

The author finds the blood-pressure of 278 Chinese at Changsha, Hunan, to be lower than the usual averages and, from a large hospital experience, that hypertension is rare. The blood pressure of 120 Occidentals living at Changsha was about the same as that of the Chinese, and lower in the majority than in America. The cause or causes are obscure. Changsha lies at 28° N. Lat.; the mean temperature is that of Alabama and Mississippi.

A. G. B.

OGILVIE (A. G.). **Testing for Occult Blood in Faeces. A Study of Alleged Fallacies.**—*Brit. Med. J.* 1927. Apr. 23. pp. 755–756. [11 refs.]

The object of this paper is to bring the examination of stools for occult blood as much within the scope of a busy general practice as is the testing of urine for albumin and sugar. The author discusses some fallacies that have been alleged against delicate blood-tests in this sphere, and he describes the pyramidon and benzidin (Gregersen) tests and his use of them in his own experimental investigations. He gives the following summary of his results; but since the whole paper is a summary of methods and results it must be read *in extenso*.

" Certain of the common articles of food, cooked in various ways, have been tested; thirty pathological cases on various diets, and exhibiting all

the alleged fallacies among them, have been investigated, and a personal experiment has been carried out. The results have been discussed, and the following conclusions have been arrived at:—

"1. The Gregersen reaction is more reliable than the pyramidon, but blue or blue-green colour must appear within thirty seconds to make the result conclusive.

"2. "Basting" seems to have an effect in producing a reaction with foods, but frying has no such effect.

"3. Bleeding due to hard tooth-brushes or teeth-sucking, and slight degrees of gum-bleeding and haemoptysis, may be disregarded, although severer degrees of bleeding may cause confusion.

"4. Iron medicines produce no "occult blood" reaction in faeces, but the ingestion of red bone marrow is incompatible with a reliable test.

"5. A blue or blue-green colour with Gregersen's test, appearing within thirty seconds, is proof positive of the presence of occult blood in the stools irrespective of the patient's diet.

"6. Meat in the diet may occasionally cause a faint colour with Gregersen's test after thirty seconds.

"7. Occult blood may occasionally be present in the stools of patients suffering from acute rheumatic fever and chorea.

"8. A milk diet is liable to cause confusion by checking bleeding."

A. Alcock.

ELVEHJEM (C. A.) & WADDELL (J.). **A Standard Method of recording the Hemoglobin Content of Blood.**—*Jl. Lab. & Clin. Med.* 1927. June. Vol. 12. No. 9. pp. 889-891. [7 refs.]

The authors lament the inconvenience of expressing the haemoglobin content of blood in terms of a so-called "normal" standard that is not in universal use. They therefore suggest that all determinations be reported in grammes per 100 cc. of blood.

"The Von Fleischl-Miescher hemoglobinometer gives a reading of grams per 100 cc. directly and the Newcomer instrument gives a similar reading when a special conversion table is used; but in many of the other instruments only the reading of the per cent. of normal is given. When using these instruments the percentage must be multiplied by the standard for the particular instrument in order to obtain grams per 100 cc.

"When all investigators report their figures in grams per 100 cc. of blood the results from all laboratories may be compared very easily without laboriously determining what instrument was used and upon what standard that instrument is calibrated. There is one precaution, however, that should be taken. All instruments should be standardized against Wong's iron method or Van Slyke's oxygen capacity method of determining hemoglobin. If all instruments are not properly calibrated figures will be of no more value than when the per cent. of normal was used."

A. Alcock.

MULLER (Henry R.). **Blood-Groups among the Yoruba Tribe of West African Negroes.**—*Proc. Soc. Experim. Biol. & Med.* 1927. Feb. Vol. 24. No. 5. pp. 437-438.

The following is the result, according to the Jansky classification, of an investigation of the blood-relations of the Yoruba tribe of West African negroes. Samples of blood from 325 individuals were examined, and reacted as follows: Group I, 52.3 per cent.; Group II, 21.5 per cent.; Group III, 23.0 per cent.; Group IV, 3.2 per cent.

A. Alcock.

MCCARRISON (Robert). **The Experimental Production of Stone in the Bladder.**—*Brit. Med. Jl.* 1927. Apr. 16. pp. 717-718. With 2 text figs. [1 ref.]

The subject of this paper is of sufficient interest for us to note the conclusions. It is itself an abstract of a paper to appear in the *Indian Journal of Medical Research*.

"1. Stone in the bladder has been produced in rats by means of an ill-balanced diet composed of foods commonly used by man. The stones were of the phosphatic variety.

"2. The main faults of this diet were: (a) absence of protein of animal origin; (b) deficiency of vitamin A; and (c) excess of earthy phosphates. To these faults there may possibly have been added a toxic action of the diet itself on the urinary tract."

A. G. B.

MCCARRISON (R.). **The Experimental Production of Stone-in-the Bladder with a Note on Pernicious Anaemia and Epidemic Dropsy. (Preliminary Note.)**—*Indian Jl. Med. Res.* 1927. Apr. Vol. 14. No. 4. pp. 895-899. With 4 figs. on 3 plates. [2 refs.]

Colonel McCarrison at Coonoor, India, produced stone-in-the-bladder in rats by means of a diet in common use by man—tinned Scotch oatmeal, linseed meal, tinned cornflour, with sodium chloride and calcium phosphate. The faults were (a) absence of protein of animal origin, (b) relative deficiency of vitamin A, (c) excess of earthy phosphates, (d) possible toxic action on the urinary tract. Eighteen animals suffered from a severe anaemia, of which 12 died.

"An outbreak of a condition resembling 'epidemic dropsy' also occurred from which 6 animals died, and 2 recovered ultimately to die from other causes. This condition was characterised by a splaying, uncertain gait, oedematous swelling of the feet and tail, punctate haemorrhage and severe anaemia. In some animals the toes and tail became gangrenous and dropped off.

"Unfortunately, these two conditions could not be studied in further detail owing to stress of other work. But it would seem that neither was solely the result of the faulty diet, but of some microbic or other pathogenic agent the action of which was favoured by the faulty food. The 'epidemic dropsy,' which had many features in common with this malady as seen in Bengal and Ganjam, would not appear to have been related to deficiency of vitamin-B in the diet; the oatmeal and linseed meal providing this factor in abundance. But the deficiency of vitamin-A in the diet may have rendered the animals susceptible to systemic infection by way of the gastro-intestinal tract and subject to toxæmias of a haemolytic nature."

A. G. B.

KÜLZ (L.). **Die Bezwungungsmöglichkeiten des heissen Klimas. [The Possibilities of overcoming Hot Climate.]**—*Abhandl. a. d. Gebiet d. Auslandskunde. Hamburg. Univ.* 1927. Vol. 26. (D., Med. & Vet. Vol. 2.) [Festschrift NOCHT.] pp. 250-255.

The author discusses this question as one of natural selection, individual adaptation to climate, and transformation of climate to suit the biological needs of man. The last has been neglected and contains great possibilities.

A. G. B.

BRAHMACHARI (Upendranath) & SEN (Parimal Bikas). On a New Method of Fixing Thick Blood Films for the Finding of Leishman-Donovan Bodies and Malarial Parasites in the Peripheral Blood.—*Indian Jl. Med.* 1928. Feb. Vol. 9. Pt. 1. pp. 1-3. With 1 text fig. [Dept. of Biochem., Univ. College of Science, Calcutta.]

Thick films, which must not be more than moderately thick, are spread by a metal spreader consisting of a metal plate the size of a slide and so ground at one end that when this is applied to the slide it makes contact only at the edges of the slide, a space being left between the slide and the central part of the ground end of the spreader. By varying the angle between the slide and the spreader the height above the slide of the central part and hence the thickness of the blood film varies. It is stated that if the film be too thick or dried too rapidly leucocytes do not attach themselves to the slide and consequently contract when dried. The film must, therefore, be of proper thickness and dried slowly. The dried film is fixed by immersion in acetone Merck extra pure for five to ten minutes. It is then dried and placed in distilled or tap water in which dehaemoglobinization is complete in about one minute. The film is then washed in methyl alcohol to remove traces of acetone, dried and stained in the usual manner with one of the Romanowsky stains. Films prepared by the method advocated by SHORTT, DAS and LAL (see above) may be treated in the same manner. The advantages of the method depend on the fact that the deforming process of dehaemoglobinization is carried out after fixation and not before as in the usual methods of dealing with thick films.

C. M. Wenyon.

D'ANFREVILLE DE LA SALLE. Démographie de Casablanca. Rapport annuel d'ensemble pendant l'année 1926.—*Rev. Méd. et Hyg. Trop.* 1927. Nov.-Dec. Vol. 19. No. 6. pp. 166-178.

BERNARD (R.). A propos d'un service de santé colonial. Programme de chef : le Colonel-médecin Damas Mora.—*Bruxelles-Méd.* 1927. Aug. 28. Vol. 7. No. 44. pp. mcccixviii-mcccxxii.

BOUFFARD. L'assistance médicale en Côte d'Ivoire pendant l'année 1925.—*Ann. de Méd. et de Pharm. Colon.* 1927. July-Aug.-Sept. Vol. 25. No. 3. pp. 309-348.

BROSIOUS (O. T.). Case Reports of *B. typhosus*, *B. paratyphosus*, and *B. coli* Infections, complicated by Tropical Diseases.—*Fifteenth Ann. Rep. Med. Dept. United Fruit Company, Boston, Mass.* 1926. pp. 141-146. With 1 text fig. [1 ref.]

CORO (A. J.). Contribucion al estudio del metabolismo basal en los paises tropicales.—*Arch. Soc. Estudios Clin. Habana.* 1927. June. Vol. 27. No. 1. pp. 7-20. [11 refs.]

DIXON (W. E.) & DE (Premankur). The Action of Certain Quinine Derivatives with Special Reference to Local Anaesthesia and Pulmonary Oedema.—*Jl. Pharm. & Experim. Therap.* 1927. Oct. Vol. 31. No. 6. pp. 407-432. With 15 text figs. [12 refs.] [Pharmacol. Lab., Cambridge.]

GOUGEROT (H.) & COHEN. Quinide érythémateuse fixe par anaphylaxie à la quinine.—*Rev. Prat. Malad. des Pays Chauds.* 1927. May. Vol. 7. No. 5. pp. 287-291. [14 refs.]

HINGSTON (H.). Some Observations on Gastric and Duodenal Ulcers in Bengal.—*Indian Med. Gaz.* 1927. Oct. Vol. 62. No. 10. pp. 543-553.

HUNT (Reid), McCANN (William S.), ROWNTREE (L. G.), VORGTLIN (Carl) & EGGLESTON (Cary). The Status of Intravenous Therapy.—*Jl. Amer. Med. Assoc.* 1927. June 4. Vol. 88. No. 23. pp. 1798-1802. [5 refs.]

- KENYA & EAST AFRICAN MEDICAL JOURNAL.** 1927. Oct. Vol. 4. No. 7. pp. 223-226.—Simple Notes on Some Tropical Diseases. A Popular Account of the Commoner Diseases of East Africa, with Hints on General Lines of Treatment, for the Use of Those Out of Reach of Immediate Medical Assistance. II. Pneumonia.
- KENYA & EAST AFRICAN MEDICAL JOURNAL.** 1927. Dec. Vol. 4. No. 9. pp. 291-293. Simple Notes on Some Tropical Diseases. A Popular Account of the Commoner Diseases of East Africa, with Hints on General Lines of Treatment, for the Use of those out of reach of Immediate Medical Assistance. IV. Ulcer.
- KUNO (Yas).** Conditions governing Perspiration and the Ability to perspire in Man.—*Jl. Oriental Med.* 1927. Sept. Vol. 7. No. 2-3. English summary pp. 39-41. [In Japanese.] [Manchuria Med. College, Mukden.]
- LABERNADIE (V.).** A propos de cas de tétanos traités par la sérothérapie (cinq guérisons).—*Rev. Méd. et Hyg. Trop.* 1927. Nov.-Dec. Vol. 19. No. 6. pp. 161-165. [2 refs.]
- MONTORO (Octavio).** El metabolismo basal en el hombre tropical. (Algunas notas aclaratorias).—*Arch. Soc. Estudios Clin. Habana.* 1927. June. Vol. 27. No. 1. pp. 21-49. With 4 text figs. [1 ref.]
- PASQUAL (J. H.).** A Case of Elephantiasis Mammae.—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1927. July 11. Vol. 21. No. 1. p. 69. With 2 text figs.
- ROHARDT (Wilhelm).** Tetanusinfektion im Anschluss an Sandflohstich.—*Muench. Med. Woch.* 1927. June 24. Vol. 74. No. 25. pp. 1054-1055.
- ROSS (Ronald).** The Ross-Manson Letters of 1895-1899. Missing Portions of Two Important Letters.—*Jl. Trop. Med. & Hyg.* 1927. June 1. Vol. 30. No. 11. pp. 145-147. [1 ref.]
- SCHÄFER (H.).** Biersche Hyperämie, ein in Kamerun bekanntes Heilverfahren.—*Abhandl. a. d. Gebiet d. Auslandskunde. Hamburg. Univ.* 1927. Vol. 26. (D., Med. & Vet. Vol. 2.) [Festschrift NOCHT.] pp. 475-476. With 2 figs. on 1 plate.
- SEVERN (A. G. MILLOTT).** Some Notes on the Institutes of Tropical Medicine and Micro-Biology in Moscow.—*Jl. Trop. Med. & Hyg.* 1927. June 15. Vol. 30. No. 12. pp. 156-158.
- SHARP (N. A. Dyce).** The Elephant Woman of Bashontai Cameroon.—*West African Med. Jl.* Lagos. 1927. Oct. Vol. 1. No. 2. p. 30. With 1 fig. on 1 plate.
- SITSSEN (A. E.).** The Normal Weight of Several Organs with the Malay Race.—*Meded. Dienst d. Volksgezondheid in Nederl.-Indië.* 1927. Part 3. pp. 490-499. [7 refs.] [Medical School, Sourabaya, Dutch East Indies.]
- SMITH (Eric F.).** Quinine.—*Jl. Roy. Army Med. Corps.* 1927. July. Vol. 49. No. 1. pp. 34-38.
- TUTUNJI (Djamil F.).** Tetanus following Intramuscular Injection of Quinine. [Correspondence].—*Lancet.* 1927. July 30. p. 257.
- ZIA (S. H.) & FOSTER (J. H.).** The Phenoltetrachlorphthalen Test in some Liver Diseases of China.—*China Med. Jl.* 1927. Sept. Vol. 41. No. 9. pp. 783-788. [6 refs.]

REVIEWS AND NOTICES.

NADKARNI (K. M.) [Edited & published by]. **The Indian Materia Medica.**—pp. xviii + 1142 + clxix + lxxxviii. 1927. Bombay: K. M. Nadkarni, P.O. Box 3558.

This is a stockily-built volume with four different lots of paging. The author in his somewhat politically tinged preface states that the book has been written to supply the "want of a handy manual treating of indigenous drugs on the lines of British Materia Medica," and he expresses the hope that "it may go side by side with a British Materia Medica as a companion volume among the Medical Students and members of the Indian Medical Profession." In expressing this hope, the author implicitly invites comparison with a British Materia Medica, but if, despite Dogberry's oft-misquoted aphorism that "comparisons are odorous," we make it, a western reader feels impelled to recall that hope oft fails of its promised largesse.

In a well-known and standard English text-book of Materia Medica, the number of drugs or drug-materials derived from plants from all parts of the world are fewer than 250, and their source, description, constituents, uses, and physiological effects are concisely given. In the book under review the plants alone number 1,053, catalogued in the alphabetical order of their scientific names. Obviously with such a multitude, individual description is out of the question and it is wisely not attempted. The scientific name is followed in most cases by a list of names in Sanskrit and the principal living Indian languages, often also in English, Persian, Arabic, Burmese, and in some cases even French, German, Japanese, Javanese and Portuguese. Such polygot lists may on occasion be useful, but in view of the casual way in which "vernacular" names are applied in any language anywhere, caution in relying on them is a virtue which the Indian medical man will have opportunity enough to exercise. After the list of names come the habitat or rather the geographical distribution in India, then commendably concise paragraphs stating the parts used, the constituents, the general physiological effects and preparations. Then comes an account of the uses, which is by no means necessarily the same as the usefulness, of the drugs. These accounts make up the greater and weakest part of the book. In too many instances they are merely an uncritical collection of unrelated statements, inferentially attributing to the drugs virtues of incredible variety and efficacy. Fifty-two drugs are catalogued under the Mineral Kingdom and fifty-one under the Animal Kingdom. There are eight appendices giving lists of drugs according to their therapeutical and physiological actions, their specific uses and other varied information of more or less value.

That India can obtain from indigenous plants or such as can be cultivated within her borders practically all the vegetable materia medica likely to be of therapeutic value is unquestionable. Notable instances are the introduced *Cinchona* in the treatment of malaria and the indigenous *Hydnocarpus* in the treatment of leprosy. Neither popular beliefs in the virtues of village or jungle remedies nor the recording of such beliefs are necessarily to be despised, but such beliefs must be scientifically tested and proved before being admitted into a rational system of therapeutics. For such work there is abundant scope in India. So while we cannot admit Mr. Nadkarni's work as a scientific guide to therapeutics, it may play a useful part in affording material to the Indian practitioner, who has the time and inclination, for testing from at least the clinical standpoint the value of the beliefs and practices, the recording of which makes up so large a part of the volume.

A. T. Gage.

BUREAU OF HYGIENE AND TROPICAL DISEASES

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UNDULANT AND ABORTUS FEVERS.

HARDY (A. V.). **Malta Fever: a Problem for State and Municipal Laboratories.**—*Public Health Rep.* 1928. Mar. 2. Vol. 43. No. 9. pp. 503-511. [8 refs.]

This paper is a plea for the larger use of the State laboratories in the diagnosis of undulant fever and, indeed, fevers in general. The author quotes EVANS as saying "there is no disease in which the physician is more dependent upon laboratory findings for a correct diagnosis than in undulant fever."

The author is of opinion that many cases of the disease have so far escaped notice by reason of the neglect of laboratory investigations. He clearly proves this by showing that when bloods sent for Widal test, i.e., for typhoid group, were also tested against *Br. melitensis*, 68 gave a positive reaction; but some of these were repeat examinations, and the total of actual cases of undulant fever detected by this means was 31 in six months. These 31 cases were all typical clinically. Whether *Br. abortus* or *Br. melitensis* was used the titre of agglutination of these organisms was practically the same. A titre of 1/1280 was obtained in some cases and any below 1/40 were regarded as negative and doubtful unless giving agglutination in titres higher than 1/80.

As the author points out, in public health laboratories dealing with large districts and with small staffs, simple and rapid methods must be employed. He uses a stock antigen of *Br. abortus* which he dilutes to an opacity equivalent to 500 million bacteria per cc., and the serum is diluted direct into the emulsion, dilutions up to 1/80 being employed; and if this is positive further dilutions are made with serum inactivated at 56° C. for thirty minutes.

Many of the specimens sent to this laboratory were dried blood specimens and a microscopic eliminating test was carried out on these. It has been found that if the blood be diluted with saline until the colour of a loop compares with that of pale vaseline, this will approximate to a dilution of 1/40. Although this is admittedly a rough method, a careful worker can at least separate positive from negative and by eliminating the latter reduce greatly the number of sera to be tested further.

For the further titration a colour comparison method (that of Wands-worth), in which standard colour dilutions of sheeps' blood are used, is employed.

The author does not care to report positive results on this dried blood method alone, but if definite positive reactions are obtained a request for a wet blood specimen is sent and this is used for the macroscopic test.

Judging from the positive Widal reactions and positive findings with emulsions of *Br. abortus*, it would appear that undulant fever is just as common in Iowa State as is enteric fever.

The conclusion is that all sera sent to laboratories from cases of fever should, as a routine, be tested against *Br. melitensis*, whether a request is made for this examination or not.

D. Harvey.

BRITISH MEDICAL JOURNAL. 1927. Dec. 17. p. 1158.—**Undulant Fever. An Appeal for the Discontinuance of Geographical Designations.**

This is a memorandum from the Malta branch of the British Medical Association and the Camera Medica, Malta, appealing for the use of the designation "undulant fever" instead of "Malta" fever, and *brucei* instead of *melitensis* for the specific designation of the causal organism. The latter proposal, in view of the intention to hold an International Botanical Congress in 1930, is not discussed in the Memorandum.

D. H.

WATKINS (W. Warner) & LAKE (G. C.). **Malta Fever with Especial Reference to the Phoenix, Ariz. Epidemic of 1922.**—*Jl. Amer. Med. Assoc.* 1927. Nov. 5. Vol. 89. No. 19. pp. 1581-1584. [7 refs.]

The plea of the Medical Council of Malta, that "Malta fever" should no longer be designated by that name is certainly reinforced by the title of the paper summarized here. Malta fever in Phoenix, Ariz., is certainly a misnomer.

The paper opens with a historical account and a description of the clinical features of the disease. The authors point out that "undulant" fever may also be a misnomer, as the temperature may run a remittent or irregular intermittent course and not in waves. They consider that the mode of entrance is, as a rule, through the intestinal tract: but this is not the case in laboratory infection.

"Malta" fever was first recognized in the United States in 1905, in Texas. It was known as "slow fever," "Rio Grande fever" and "mountain fever." In 1912 it was recorded in Arizona, at Prescott, and was traced to consumption of goats' milk. In April, 1922, herds of goats were brought to Phoenix and a considerable amount of raw goats' milk was consumed. In May and June cases of fever of unknown origin were signalled and some cases were diagnosed by agglutination tests as Malta fever; in August the use of goats' milk was discontinued.

FRANCIS and EVANS have pointed out that the sera of patients suffering from tularaemia may agglutinate *Brucella melitensis* and *abortus* cultures. If the agglutination titre for one of these organisms is much raised above the other two, this may be taken as diagnostic of infection by that disease, but if all three are of equal titre absorption tests are necessary.

Thirty-seven of the Phoenix cases gave a positive reaction with *melitensis*. The sera were not heated and *abortus* emulsions were not

used. Two cases were fatal. 18.3 per cent. of the sera of the herd of goats gave a positive reaction with *Br. melitensis*. All the cases showed a leucopenia and mononucleosis.

D. H.

PARTEARROYO (F. R.). La fièvre méditerranéenne en Espagne. [*Mediterranean Fever in Spain.*—*Bull. Office Internat. d'Hyg. Publique.* 1927. Oct. Vol. 19. No. 10. pp. 1463-1465.]

Undulant fever has long been known to occur in Spain. In 1814 it was recorded by BURNETT in Carthagená. The malady as a rule occurs in endemic fashion with occasional epidemic outbursts, especially in the summer along the Mediterranean littoral. Cases have also been recorded in such cities and towns as Madrid, Toledo, Segovia, Badajoz and Zamora. In 1922 in the town of Alicante 123 cases were diagnosed by laboratory methods in three months with 15 deaths.

The infection is widespread among goats. In one investigation 60 per cent. of those examined gave a positive agglutination reaction; and the infection in goats has a direct relation to the amount of the fever among the inhabitants of the districts.

Bacteriologically the *Br. melitensis* isolated in Spain does not differ in any important particular from strains isolated in other countries. Infections by *Br. abortus* have not so far been recorded in Spain, nor has *Br. paramelitensis* been met with.

The author does not agree that heating of sera to 56° C., as recommended by NÈGRE and RAYNAUD, is of much assistance in rendering agglutination more definite. NÈGRE and RAYNAUD believe that the group or non-specific agglutinins so frequently met with in this fever are due to a raised anti-tryptic power of the blood, which is removed by heating. But the author points out that such group or non-specific agglutinins are not met with in sera which are known to possess high anti-tryptic power, such as the sera of persons suffering from cancer, suppuration, etc. Also in the author's hands heating of the sera reduced the specific agglutinins as well as the non-specific. He has found the intracutaneous reaction of BURNET of use in diagnosis.

There is nothing remarkable about the clinical course of the disease in Spain. One of the most marked of the clinical signs noted was an enlargement of lymph glands. This was specially so in a case of laboratory infection.

Specific treatment consisted in the administration of anti-serum in a dose of 50 to 60 cc. every day while the temperature is raised, and, in addition, vaccine every third day in a dose of two million germs. Neosalvarsan was used in acute cases with success, 15 cgm. being given every second day.

D. H.

CÉSARI (E.). Prophylaxie de la fièvre méditerranéenne (diagnostic de l'infection mélitensique chez les animaux). [*Prophylaxis of Undulant Fever. Diagnosis of Melitensis Infection in Animals.*—*Rev. Gén. de Méd. Vét.* 1928. Jan. 15. Vol. 37. No. 433. pp. 1-9. [3 refs.]

This paper refers to the undoubted spread of undulant fever in France and points out that from the animal point of view it is no longer a question only of goats, but sheep, cows and pigs must also be considered as possible infective agents.

The author refers to the regulation published in 1903, which gives public authorities the power to segregate infected animals and herds and to prohibit the sale of their milk. Working on this statute Césari considers that a great deal can be done to limit the spread of undulant fever. He points out, however, that infection with *melitensis*, unless it produces actual abortion, may give rise to no symptoms whatever in goats or sheep.

He cites two instances where cases of undulant fever had arisen and the source of infection (goats' milk) was definitely traced to small itinerant herds of goats. These animals appeared to be in perfect health, but by dint of carrying out agglutination reactions with the serum of all the goats and culturing samples of milk, he was able to show definite evidence of infection in two of these herds. These herds were isolated and the sale of their milk stopped.

By such a system of prophylaxis he suggests that a great deal could be done by veterinary officers to check the spread of the disease.

D. H.

LOURIÉ (M.), KOSSAREW (N.) & ROSENBLATT (A.). Observations sur la fièvre de Malte. [Notes on Undulant Fever.]—*Russian Jl. Trop. Med.* 1927. Vol. 5. No. 8. French summary p. 534. [In Russian pp. 473-480.] [Moustabekow Inst. of Microbiol. & Hyg., Baku, Azerbaijan.]

This paper deals with 41 cases of undulant fever, of which 12 had been contracted in the laboratory. Agglutination tests were carried out in all cases and the titre varied from 1/100 to 1/4000. In 5 cases blood cultures were attempted, with 2 positive results. Some of the cases continued for two years, and it is interesting to note that the titre of agglutination gradually increased during this period from 1/100 to 1/2000. In some cases, however, the reaction became negative and did not reappear. The complement fixation reaction was in parallel with the agglutination tests. The intradermal reaction of BURNET gave contradictory results.

D. H.

MONTAGNANI (Mario). Sulle forme pseudoaddisoniane. (A proposito di una sindrome di tipo addisoniano da febbre maltese). [The Syndrome of Addison's Disease occurring in Undulant Fever.]—*Riv. Clin. Med.* 1927. Mar. 15 & 30. Vol. 28. Nos. 5 & 6. pp. 165-185; 209-231. [Numerous refs.]

This article is of interest from two points of view. The case recorded affords an instance of the protean manifestations of undulant fever, and adds yet another to the list of conditions other than true Addison's disease in which the signs of adrenal insufficiency are prominent.

BARBÀRA in 1920 was the first to describe a case of undulant fever with the Addisonian symptom-complex and, in fact, as a result of experimental inoculation of laboratory animals with *Br. melitensis* found lesions of the adrenal cortex—haemorrhage, necrosis, lymphocytic infiltration and fibrosis. The subject of the present article appears to be the second instance.

The patient was a woman of 48 years, who fell ill with undulant fever in December, 1925. After five or six weeks she moved to the hills, where she remained for 4 months, and it was towards the end of this period that the

symptoms referred to began to appear—increasing weakness and prostration, with pigmentation, a general darkening of the skin, but more intense over sites of pressure. During the succeeding two months there was a recurrence of the fever, and gastric disturbances supervened with attacks of epigastric pain. Haemoculture was negative, but the serum agglutinated *Br. melitensis* in a dilution of 1:800. The minutest details are given of the examination of the various organs, systems and body-fluids; the patient was in very truth long-suffering. Most of the results, as would be expected, were negative, with the exception of those pointing to affection of the adrenals. The blood-pressure was low, the systolic being only 100 mm. Hg. (Riva-Rocci) and the pulse-pressure 44 mm. In December, 1926, after treatment, this improved, the systolic pressure being 135 mm. and the diastolic 90 mm. The examination of the nervous system was most thorough and the results are recorded in terms of endocrine disturbance as a marked want of equilibrium in both tonus and excitability, a hyperorthosympathicotonia, etc.

To the question why the *melitensis* infection should have given place to the syndrome of Addison's disease the author replies that the toxin of this infection can produce the symptoms [which, after all, savours rather of tautology than of explanation. The record with its wealth of detail will constitute a work of reference should future cases of a similar nature be met with.]

H. Harold Scott.

SAPPA (S.). Forma pseudo-tubercolare della febbre di Malta. [**Undulant Fever simulating Tuberculosis.**]—*Riforma Med.* 1927. Dec. 5. Vol. 43. No. 49. pp. 1167–1170. [35 refs.] [Civ. Hosp. Cuneo.]

The author records three cases as examples of undulant fever simulating pulmonary tuberculosis. The resemblances were certainly very close—wasting, sweating, fever, cough, mucopurulent and even bloody sputum, and physical signs such as dulness to percussion, falling in of the supraclavicular regions, and the presence of râles. In each blood-culture for *Br. melitensis* was negative, but the serum agglutinated the organism in a titre of 1:700 or higher. The tuberculin reaction was positive in all. The blood-picture showed a reduction of erythrocytes to between 3 and 4 million per cmm., and a little leucocytosis, with a marked relative lymphocytosis, in one patient as high as 84 per cent. All three improved rapidly after an injection with antimelitensis serum followed by vaccines, and left hospital apparently quite well within three months of coming for treatment.

H. Harold Scott.

OLIVERO (Carlo). Note ematologiche sulla febbre melitense. [**Note on the Haematology of Undulant Fever.**]—*Riforma Med.* 1928. Feb. 20. Vol. 44. No. 8. pp. 197–198. [13 refs.] [Hosp. of St. John Baptist, Turin.]

A brief account is given of four cases of this disease in which numerical examination of the white corpuscles was made. The total leucocytes varied between 7,200 and 8,400 per cmm., and the differential count gave a large mononucleosis (including transitional forms) of between 27 and 38 per cent. at the expense almost entirely of the polymorphonuclears.

H. Harold Scott.

SCOTT (R. W.) & SAPHIR (O.). *Brucella melitensis* (*Abortus*) Bacteremia associated with Endocarditis.—*Amer. Jl. Med. Sci.* 1928. Jan. Vol. 175. No. 1. pp. 66-69. With 2 figs. on 1 plate. [2 refs.] [Cleveland City Hosp. & Western Reserve Med. School, Cleveland, Ohio.]

This was a case of fever in a white male—a Hungarian, aged 21—who gave a history of acute rheumatic fever at age 13 and a second attack when he was 19 years of age.

He was admitted to the City Hospital, Cleveland, in January, 1926. He gave a history of fever and chills and pain over the region of the heart of one month's duration. On examination there were signs of mitral stenosis and a faint diastolic murmur could be detected over the aortic area, but the pulse was not of the Corrigan type. Several blood cultures were taken, but all were negative. A tentative diagnosis of subacute bacterial endocarditis superimposed on an old mitral and aortic lesion of rheumatic origin was made. The patient left hospital at his own request and contrary to advice, but was again admitted in August, 1926, in acute distress from abdominal pain in the region of the spleen; there was also some paresis of the right arm and difficulty of speech, suggesting splenic infarct and embolism.

A blood culture was taken shortly after admission and from it a gram-negative bacillus was obtained. The same organism was obtained repeatedly during the month that the patient lived. The cultures taken in broth showed no change till the 6th day, when a faint cloudiness appeared. Sub-culture on agar showed growth after 2 days. The bacilli or cocci were non-motile, fermented no carbohydrate and did not liquefy gelatine. The patient's serum agglutinated the bacilli up to a dilution of 1/1000; control sera negative. A rabbit injected intravenously with 1 cc. of a suspension from an agar culture was sick for a few hours, but two days later appeared normal. Fourteen days later the rabbit was injected intravenously with 2.5 cc. of suspension and died three days later, and the bacillus was recovered from the heart blood and the spleen. The serum of this animal agglutinated the bacillus up to 1/3000; controls negative.

A stock *melitensis* serum was obtained and also stock cultures of *Br. melitensis* and *Br. abortus*. With this serum the patient's bacillus was agglutinated up to a dilution of 1/1600. The patient's serum agglutinated *melitensis* up to 1/800 and *abortus* to 1/1600. Absorption experiments indicated that the patient's bacillus was of the *abortus* variety. The post-mortem revealed a chronic pericarditis and endocarditis, with an acute inflammatory condition of the endocardium superimposed.

The authors are not prepared to say that this endocarditis was actually caused by *melitensis*, but prefer to describe the case as one of acute and chronic endocarditis associated with *Br. abortus* bacteraemia.

D. H.

LEMIERRE (A.), MARCHAL (G.) & JAUBERT (A.). Un cas de fièvre ondulante autochtone. Valeur diagnostique et thérapeutique de l'intradermoréaction de Burnet. [An Indigenous Case of Undulant Fever. Diagnostic and Therapeutic Value of the Intradermal Reaction of Burnet.]—*Bull. et Mém. Soc. Méd. Hôpit. de Paris.* 1927. Dec. 29. Year 43. 3rd Ser. Vol. 51. No. 37. pp. 1702-1709. With 2 charts.

This is a description of a long-drawn-out case of undulant fever lasting more than five months. At first the case was considered to be influenza, and later rheumatism, endocarditis and tubercle were suggested. Blood cultures taken on two occasions were negative. There was no enlargement of the spleen until the sixth wave of fever had occurred.

The fever commenced in January, 1927, and it was not till May 22nd that a positive blood culture was obtained. On May 3rd an intradermal injection of "melitine" was made—1/10 cc.—and this was followed by a strong positive local reaction and also a marked general reaction. This general reaction was followed by fever for four days, then convalescence set in and complete recovery followed. The blood count showed a slight degree of anaemia with a leucocytosis, at first mononuclear but 30 hours later polynuclear.

The blood serum heated to 56° C. gave a positive reaction in a dilution of 1/200 with *Br. melitensis* and *Br. abortus*; heated to 65° C. no reaction with either. In view of the greater thermo-stability of the *abortus* agglutinins this, in the author's view, pointed to a diagnosis of *melitensis* infection.

There was a history of consumption of cheese made from goats' milk. There were no other cases anywhere in the neighbourhood.

The authors discuss the laboratory diagnosis and point out the necessity of keeping a blood culture for at least 20 days before giving a negative answer. They are also convinced of the utility of "melitine," not only as a diagnostic, but as a therapeutic agent, and recommend its use in all cases of undulant fever.

Friedlander's bacillus was isolated from the urine in the course of the disease.

D. H.

DEBRÉ (Robert), MARIE (Julien) & GIROUD (Paul). Fièvre ondulante autochtone. Intérêt de l'épreuve à la mélitine de Burnet. [*Indigenous Undulant Fever in Paris. Observations on the Dermal Reaction of Burnet.*—*Bull. et Mém. Soc. Méd. Hôpit. de Paris.* 1927. Dec. 22. Year 43. 3rd Ser. Vol. 51. No. 36. pp. 1654-1663. [2 refs.]

The case fully described is that of a boy of 11 years who had never left Paris and who had had "waves" of fever for some months without a definite diagnosis having been reached.

He had complained of great lassitude and pains in the joints and limbs, and was seen by the authors on April 5th, 1927. On January 22nd, 1927, the appendix had been removed on account of severe pains in the abdomen but without effect on the temperature, which had risen again a few days after the operation. He was carefully examined on April 5th, and the only physical sign noted was enlargement of the spleen. The cuti-reaction with tuberculin was negative, and a blood count showed a leucocytosis with scarcity of polynuclear cells.

Red cells	...	5,470,000	per c.mm.	
White cells	...	16,000	"	
Polymorphs	...	21	per cent.	
Lymphocytes	...	14	"	
Large mononuclears	...	1	"	<div style="display: inline-block; vertical-align: middle;"> <div style="font-size: 3em; vertical-align: middle; line-height: 1;">}</div> <div style="display: inline-block; vertical-align: middle; padding-left: 5px;"> 78 per cent. mononuclears. 22 per cent. polynuclears. </div> </div>
Mononuclears	...	42.5	"	
" granular	...	19.5	"	
Transitionals	...	1.5	"	

The parents informed the authors that the child consumed unboiled goats' milk each summer purchased from an itinerant goatherd in Paris. The diagnosis of undulant fever was therefore considered and verified by means of the laboratory examinations. The heated serum gave a positive reaction in a dilution of 1/100 for *Br. melitensis* and *Br. abortus*; negative for *paramelitensis* and the typhoid group. The intradermal reaction with Burnet's melitine was carried out on several occasions, at first as a means of diagnosis and latterly as a method of treatment. On April 26th a dose of 2/10 cc. was given by the intradermal route and gave a strongly positive local reaction, and in addition a general reaction evidenced chiefly by a

marked rise of temperature. This local and general reaction followed each intradermal dose, and at the same time there was some improvement in the child's condition. This improvement following doses of melitine had already been noted by BURNET.

The diagnosis of the case was finally settled by a successful blood culture. The organism took 7 days to show up in the flasks of broth to which the blood had been added. Specific sera were not to hand, but the non-Gram staining coccus which grew out in agar from the broth culture was shown to be *Br. melitensis* and was agglutinated to the same titre as stock *Br. melitensis* by the serum of the patient. The patient continued to run a temperature until August, when the fever ceased and he regained his usual health, but the spleen remained enlarged.

The points emphasized by the authors are the fact that the consumption of unboiled goats' milk in Paris itself may give rise to undulant fever, and that the intradermal reaction of BURNET is useful in diagnosis and possibly also as a therapeutic measure.

ZOELLER, who took part in the discussion, said in his hands injection of blood (5 cc.) taken from the patient himself and given every 5 days had yielded good results.

D. H.

WORDLEY (E.). A Note on Two Unusual Cases of Fever.—*Lancet*. 1927. Dec. 17. p. 1290.

The two cases were similar, so only one is described in detail. This was in a man, aged 36, who had not been abroad for two years. The clinical description of the case is that of typical undulant fever with marked weakness and severe pains in the joints. There were several waves of fever and the total duration of the illness was at least two months. The agglutination test for enteric fever was negative, but for *Br. melitensis* positive to a dilution of 1/600. Blood culture and urine culture were sterile. The agglutination test with *Br. abortus* was not carried out. Careful enquiry was made regarding cases of abortion in cattle, but no history of such could be obtained; no goats were kept in the neighbourhood.

The second case was similar clinically, and so also were the results of culture and the agglutination tests, the latter being positive in the same dilution as in the first case.

The author asks what significance may be attached to a positive agglutination titre against *Br. melitensis* in a dilution of 1/600. The query is answered by Dr. MANSON-BAHR in a letter to the *Lancet* of December 31st of the same year entitled "Is it undulant or abortus fever in Great Britain." He refers to two cases which came under his care. In one a gentleman owned a herd of cattle in which contagious abortion was prevalent. He was in the habit of drinking unboiled milk from the cows and developed an attack of undulant fever. The blood serum agglutinated *Br. melitensis* in 1/800 and *Br. abortus* in 1/1200. The second case was that of a gentleman who suffered from fever for over four months, whose serum agglutinated *Br. abortus* in 1/160 and *Br. melitensis* in 1/640. Dr. MANSON-BAHR considers that these reactions, provided the serum has been heated to 56°C., are diagnostic, and a like remark applies to Dr. Wordley's results. Dr. MANSON-BAHR quotes two cases of severe undulant fever diagnosed on clinical grounds and by isolation of the organism from the blood and from the urine, and in neither was the agglutination titre higher than 1/80.

D. H.

MANSON-BAHR (Philip). **Fever of the Undulant Type in England and on the Possibility of the Occurrence of *B. abortus* Infection in Man with an Account of Two Cases observed.**—*Abhandl. a. d. Gebiet d. Auslandskunde. Hamburg. Univ.* 1927. Vol. 26. (D., Med. & Vet. Vol. 2.) [Festschrift NOCHT.] pp. 274–277. With 1 plate. [14 refs.]

The gist of this paper is contained in the author's letter to the *Lancet* of December, 1927, noticed above. In addition to describing two cases of undulant fever in England which came under his care, he brings forward evidence in favour of the view that undulant fever in various countries may be caused by *Br. abortus* either by the drinking of the milk of cows suffering from infection or by contact with diseased animals, either cows or pigs.

[This view is apparently not generally accepted in Germany, as is shown in the paper by BASTAI summarized in this number. These authors consider that *Br. melitensis* and *Br. abortus* cannot be distinguished bacteriologically, but that the former is pathogenic for man and animals, the latter for animals alone.

It is obvious, however, from a study of the two cases reported in this paper and of the other cases referred to, that undulant fever may arise where goats and goats' milk can be entirely excluded as sources of infection and cows' milk is the obvious cause.]

D. H.

MESSIERI (Albino). **L'infezione melitense dell'uomo di origine bovina. [Infection of Man by Brucella of Bovine Origin.]**—*Nuova Veterinaria.* 1928. Jan. 15. Vol. 6. No. 1. pp. 3–11. [Royal Inst. Vet. Med., Bologna.]

This article gives a good summary of the abortus-melitensis problem up to recent times from which the author draws the following conclusions: 1. That cattle suffering from epizootic abortion can transmit to man infection which produces a septicaemic type of fever resembling undulant fever; 2. That this is most likely to arise when the bovine infection has been recently acquired from goats or sheep; 3. Admitting the possibility of transmission of infection from cattle to man, and the possible short period of contagion of cattle, the organisms presenting the same characters, it is held that *Br. abortus* and *Br. melitensis* are essentially one and the same, but varying in degree of virulence for man according to the source whence the infection was acquired.

H. Harold Scott.

BASTAI (Pio). **Ueber die Frage der Banginfektion beim Menschen. Abortusinfektion beim Menschen oder Melitensisinfektion beim Rind? [The Question of Abortus Infection in Man.]**—*Muench. Med. Woch.* 1927. Dec. 16. Vol. 74. No. 50. pp. 2141–2142. [12 refs.] [Med. Clinic., Univ. Turin.]

The argument is sustained thus: The bacilli of Bang and of Bruce cannot be distinguished bacteriologically. The experimental results favour the pathogenicity of the latter for cattle and are against that of Bang's bacillus for man. A study of the epidemiology leads to two conclusions: (1) At the Tunis Pasteur Institute, laboratory infection with melitensis is so common that preventive inoculation is compulsory,

but in the veterinary laboratory where foetuses and membranes of infected cattle are examined daily, infection is unknown; nor are the veterinarians who vaccinate against abortion with living virulent bacilli ever attacked; (2) the areas of distribution of *melitensis* and *abortus* infection do not correspond: indeed, in districts where *abortus* is most common *melitensis* infection is absent.

A. G. B.

LEDoux, ARCHER & CLERC. Fièvre ondulante d'origine bovine. [**Undulant Fever of Bovine Origin.**—*Bull. et Mém. Soc. Méd. Hôpît. de Paris.* 1928. Feb. 23. Year 44. 3rd Ser. Vol. 52. No. 6. pp. 290–294.]

The authors discuss the close affinity of *Br. melitensis* and *Br. abortus* and recall that COURTOIS-SUFFIT treated a case of *melitensis* infection successfully by injections of the endo-protein of *abortus*. They also point out that in 1923 NICOLLE inoculated five volunteers subcutaneously with a culture of *Br. abortus* without any effect. They conclude that neither by their cultural, morphological nor serological reactions can these organisms be separated the one from the other. Their pathogenicity or non-pathogenicity for man alone distinguishes them. They point out, however, that in recent years, in all parts of the world—Rhodesia, America, Italy, France—cases of undulant fever have arisen whose serum agglutinates both *Br. melitensis* and *Br. abortus* in equal titre, in which there has been no contact whatever with goats or goats' milk but close association with cows which have suffered from epizootic abortion.

The authors describe a third case in France of this nature.

This was the case of a farmer in the Jura district. He had no goats on his farm or in his neighbourhood, but six of his cows had aborted and he himself had looked after them and had drunk the milk. In June, 1927, about a month after the last case of abortion in the cows, the farmer developed a dry cough, with slight fever, and sweatings, pains in the back and limbs. A diagnosis of tubercle was made. By September the fever definitely took on the undulant type and the spleen became enlarged. Two blood cultures, taken at 10-day intervals after four months' fever, were negative. [Cultures only kept for 8 days.] The serum of the patient agglutinated *Br. melitensis* up to a dilution of 1-2000 and two strains of *abortus*, one from the Pasteur Institute and one from Italy, at the same titre. Heating the serum to 65° C. for thirty minutes removed all agglutinins both for *melitensis* and *abortus*, which is not in accordance with the findings of FICAI and ALESSANDRINI, who suggest this method for differentiating the two infections, since they consider that the *abortus* agglutinins are more thermo-stable.

Absorption of the diluted serum of the patient with thick emulsions removed the agglutinins both for the homologous organism and for *abortus*, and absorption with *abortus* also removed all agglutinins. A double intradermal reaction was carried out with 2/10 cc. abortine and a like dose of melitine. Both gave a strongly positive reaction. No difference could be made out between the two results. The only reservation made is that the patient had already received eleven doses of *melitensis* vaccine, and for this reason too much stress cannot be placed on the intradermal tests.

The authors sum up by saying that this was a typical case of undulant fever due to an infection of an unidentified member of the *Brucella* group, but undoubtedly of bovine origin.

D. H.

VAN DER HOEDEN (J.). De abortusbacterie van het rund (bact. abortus infectosi Bang) ziekteverwekker bij den mensch. [The Abortus Bacterium of the Cow causing Disease in Man.]—*Tijdsch. v. Diergeneesk.* 1928. Mar. 1. Vol. 55. No. 5. pp. 209-224. English summary p. 226. [50 refs.] [Central Public Health Lab., Utrecht.]

The author remarks that with a view to determining the pathogenicity of *Br. abortus* for man it is of prime importance to study every case of undulant fever arising in countries or districts where *Br. melitensis* infections are unknown; and he adds, with truth, that simple demonstration of agglutinins for *Br. abortus* in the serum of human cases is not sufficient evidence. He then proceeds to describe a case, the first in Holland, of infection of man by an organism derived from cows subject to epizootic (contagious) abortion.

The patient was a baker, aged 48, living in a small village in Holland, the owner of six cows. For six months previous to the date of his coming under notice he had suffered from what was evidently a typical attack of undulant fever. The agglutination test for typhoid carried out at various times was entirely negative, whereas *Br. abortus* was agglutinated to a titre of 1/6400 and *Br. melitensis* to 1/800 by the serum of the patient. The complement fixation test with the serum gave a positive reaction when an emulsion of *Br. abortus* was used as antigen and a "partial" positive with *Br. melitensis*. Attempts to cultivate the bacillus from the blood and urine were unsuccessful. The intradermal injection of abortine and melitine gave a strong positive general and local reaction. Of 11 controls 3 gave a local reaction; none a general reaction.

Four of the five cows belonging to the baker had aborted between February and the end of May, 1927. He himself on these occasions had attended to the cows, and the last time he had a small wound on the hand. He took no precautions in the way of disinfection and became ill, as already said, with an undulant fever in May, 1927. Three of the cows showed a positive agglutination of *Br. abortus* up to a dilution of 1/1600 or 1/3200 and controls only to 1/50.

The baker had never left his own neighbourhood and he kept no goats, nor were there any imported goats in the neighbourhood.

[This appears to be a very clear cut case of infection directly derived from cows the subjects of contagious abortion, although it is not stated whether the man drank the unboiled milk of the cows; but apparently his was the only case of this fever and he alone attended the sick cows. It is also unfortunate that the organism was not isolated from the cows or from the baker.]

D. H.

HABS (Horst). Die Menschenpathogenität des *Bact. abortus* Bang. [The Pathogenicity for Man of *Br. abortus* Bang.]—*Klin. Woch.* 1928. Mar. 4. Vol. 7. No. 10. p. 453.

The author refers to five recent cases of undulant fever in man in Germany which were attributed to infection by *Br. abortus*. All occurred in veterinary surgeons who had been in contact with cows suffering from epidemic abortion.

In the medical clinic at Kiel there were under the author's care at one and the same time four cases of undulant fever which were clinically typical of this infection, with enlarged spleen, leucopenia, etc., but in none of the patients was there any evidence of association with animals

suffering from abortion, nor any history of the consumption of goats' milk, but all four gave histories of the consumption of unboiled cows' milk, and the author considers that the infection was thus acquired.

The serum of the patients agglutinated *Br. abortus* in a dilution of over 1/1000, and, in one case, a bacterium was isolated from the blood which was in morphology, in cultural characteristics and by serological tests identical with *Br. abortus* of animal origin.

The author adds that in none of his cases was there any evidence of infection by *Br. melitensis*, but that this organism cannot be differentiated by any method of laboratory technique from *Br. abortus*.

[Apparently the author considers that if a coccus is derived from cows, whether they are suffering from abortion or not, it is *Br. abortus*; whereas if the coccus is derived from goats' milk, it is *Br. melitensis*. But he overlooks the possibility of the infection of cows derived from goats. It would be better, in view of his statement that *Br. melitensis* cannot be distinguished from *Br. abortus*, if he had said that these cases were cases of undulant fever infected with one of the *Brucella* group of bovine origin.]

D. H.

CLARK (Taliaferro). Recherches récentes sur la fièvre ondulante aux États-Unis d'Amérique. [Recent Researches into Undulant Fever in the U.S.A.]—*Bull. Office Internat. d'Hyg. Publique*. 1927. Oct. Vol. 19. No. 10. pp. 1460-1462.

Up to recent years it was believed that undulant fever in the United States of America was confined to the Mexican frontier. But lately it has been definitely recorded as occurring in Texas and in Arizona. In 1922 a small epidemic was recorded in Phoenix, in Arizona. Practically all the cases gave a history of the consumption of goats' milk. The clinical type of the disease, the causal organism and the source are the same as those of the similar infection in the Mediterranean.

But more recently it has been found that in the United States infections occur due to the bovine variety, *Br. abortus*. This bacillus causes contagious abortion both in pigs and cattle. Abortion in pigs is extremely common, these animals are all intended for the slaughterhouse, and are sent there irrespective of infection. As a result cases of undulant fever are fairly common among workers in the abattoirs.

An infected cow although apparently in good health may continue to excrete the bacillus in the milk for many months. Many people, therefore, are exposed to infection from consumption of such milk unless it is pasteurized, but fortunately *Br. abortus* in milk is not highly pathogenic for man. Yet undoubted cases of infection from *Br. abortus* in raw cow's milk have been recorded in America, as evidenced by the absorption of agglutination tests and the isolation of the organism from the cow's milk.

The Hygiene Laboratories in Washington have reported 23 cases of undulant fever due to *Br. abortus* in the last five years. In 8 of these infection was traced to the consumption of milk; 2 were laboratory infections; in 6 others infection was contracted by handling sick animals—pigs or cows; 1 other case was that of an agricultural expert who was called in to advise in the treatment of abortion in cattle on a farm—16 days after his visit he developed undulant fever, from which he died. These cases were scattered over eleven different States in North America.

One hundred and ten sera which did not react to typhoid were tested against *abortus* and 6 showed a high titre for this organism of diagnostic significance.

D. H.

ORR (Paul F.) & HUDDLESON (I. F.). **An Epidemiological Study of Undulant Fever in Michigan.**—*Amer. Jl. Public Health.* 1927. Dec. Vol. 17. No. 12. pp. 1242-1247.

In the last three or four years 16 cases of undulant fever have been notified. In 6 of these *Br. abortus* was isolated from the blood and urine; the sera of the remaining 10 agglutinated *Br. abortus* up to 1/640 to 1/10,000. All the cases were clinically typical of undulant fever. Six of the cases lived on farms, the remainder in cities of varying size. The ages of the patients ranged from 9 years to 63 years.

Seven of the 16 had quite definitely never had anything to do with cattle or hogs. Four gave a history of abortion in their cattle. In no case was there a history of contact with goats or the consumption of goats' milk, but all gave a history of the consumption of unboiled cows' milk, a history of abortion in the cows which yielded the milk was obtained and *Br. abortus* was actually isolated from the milk.

In one case a man who previously had not been in the habit of drinking milk, except in small quantities in tea, commenced to drink a pint a day. A month or so later he went down with undulant fever.

There were no secondary cases in any of the households in which cases had occurred.

It is believed that one-third of the cattle in the State are infected; but abortion in hogs in Michigan is very rare. It is probable that cases in human beings have been missed, but there are not a great number owing probably to the low pathogenicity of *Br. abortus* for man by the oral route.

The authors conclude that even in the patients who were employed on farms where abortion in cattle had occurred, the infection had been caused by the consumption of milk and not by contact.

D. H.

WOLLMAN (E.). Le rôle des mouches dans le transport de quelques germes importants pour la pathologie tunisienne. [**The Role of Flies in the Spread of Germs in Tunis.**]—*Arch. Inst. Pasteur de Tunis.* 1927. Dec. Vol. 16. No. 4. pp. 347-364. With 4 text figs. [5 refs.]

The rôle of flies in the spread of undulant fever.—The flies used in these experiments were bred out in sterile excreta from eggs, the surface of which had been sterilized by perchloride of mercury. (Flies in Tunis have ready access to material contaminated with *Brucella melitensis*, such as goats' milk and goats' urine.) The actual organism used in the experiments was *Br. abortus*, not *Br. melitensis*.

(1) A fly—*M. domestica*—was introduced into a tube containing a broth culture of *Br. abortus*, then transferred to a sterile tube, and three days later to an agar tube; no growth.

(2) Three aseptic flies were placed in a vessel containing cotton-wool soaked in a broth culture of *Br. abortus*; 18 hours later they were placed in a sterile tube, and 48 hours later transferred to an agar tube. Result, no growth.

(3) One aseptic fly was experimentally contaminated with *Br. abortus* culture; 24 hours later placed on agar. Result, no growth.

(4) One green fly (*Lucilia*) was introduced into a sterile tube containing cotton-wool soaked in *Br. abortus* culture; 48 hours later transferred to a tube of agar. The fly adhered to the agar and died there; around it a growth of *Br. abortus* spread.

(5) Two *M. domestica* (aseptic) were placed in a tube containing cotton-wool soaked in *Br. abortus* culture fluid; 24 hours later transferred to agar. Result, growth.

Flies up to 24 hours are capable of transmitting *Br. abortus*, and presumably also *Br. melitensis*, but after 48 hours they free themselves from infection (auto-sterilization).

D. H.

BURNET. Impossibilité de vacciner la chèvre contre le *M. melitensis* par des doses énormes de vaccin. [Impossibility of vaccinating the Goat against *Br. melitensis* by Enormous Doses of Vaccine.]—*C.R. Acad. Sci.* 1927. Dec. 27. Vol. 185. No. 26. pp. 1627-1629. [3 refs.] Also in *Arch. Inst. Pasteur de Tunis*. 1928. Mar. Vol. 17. No. 1. pp. 73-78. [3 refs.]

Preventive vaccination of the goat against *Br. melitensis* is the best prophylaxis against undulant fever. Unfortunately, every time that science makes a step towards this end, the goal recedes before her. The goat has a natural resistance to *Br. melitensis* and can clear itself of the infection.

The author's idea was that previous efforts had been made with too small doses and that what was wanted was very large doses. ASCOLI and SANFILIPPO had vaccinated goats, using enormous doses of vaccine—2, 4, 8 and 18 petri-dish cultures killed by heat and injected at intervals of 10 days. Two goats so treated showed no infection when subsequently tested by the oral route and by inoculation. Burnet was not able to confirm this observation. A young goat received the following doses of heated *Br. melitensis* :—

June 16th ...	Approximately 25 milliards of heated <i>Br. melitensis</i> .
June 27th ...	Approximately 80 milliards of heated <i>Br. melitensis</i> .
July 12th ...	Approximately 20 milliards of heated <i>Br. abortus</i> .
July 21st ...	Approximately 35 milliards of heated <i>Br. melitensis</i> .
August 8th ...	Approximately 1,200 milliards of formalized <i>Br. melitensis</i> .
August 19th ...	Blood culture negative.
Sept. 16th ...	Sero reaction 600+ +
Oct. 18th ...	Test dose, 2 milliards living <i>Br. melitensis</i> under the skin.

TABLE.

		Vaccinated Animal.	Control.
Nov. 2nd ...	14th day after test dose ...	+	+
	Blood culture agglutination...	800	2,500
Nov. 12th ...	24th day after test dose ...	+	+
	Blood culture agglutination...	1,000	1,400
Dec. 14th ...	56th day	+	—
	Haemoculture agglutination	800	800
Jan. 4th ...	77th day	—	—
	Haemoculture seroreaction ...	600	1,000

All three blood cultures were positive in both animals, showing that the previous inoculations had not prevented a general blood infection.

Burnet considers that the goat cannot be immunized by vaccines but can establish a tolerance to the organism, and may finally free itself entirely from the infection.

D. H.

HADDON (E. H.). **Some Observations on *Bacillus abortus* and *Bacillus melitensis*.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1927. Nov. 25. Vol. 21. No. 3. pp. 221–226.

Investigations had been made at the Entebbe laboratory of the relationship between *Br. melitensis* and *Br. abortus*, but owing to pressure of other work the full programme laid down could not be undertaken. It was noted, however, that when these two bacteria were grown on the stock medium used for routine sub-culture (2 per cent. Difco peptone, 1.5 per cent. agar), pH 7.4, after a period of over one year, a distinct difference in growth was noted. The *abortus* cultures, with one exception, gave a tenacious, sticky growth on the agar, whereas *melitensis* showed no change. This change was not obvious to the naked eye, but was most evident when sub-cultures were made on to other media, when the "sticky" nature of the *abortus* culture was obvious.

An elaborate series of experiments was carried out to determine the sulphur-nitrogen ratio in the proteins of the bacteria, and for details of these reference should be made to the original paper; but the conclusion arrived at was, this ratio does not serve to distinguish the one group of organisms from the others.

When transferred to rich nutrient agar after subculture for some (five) months, the *abortus* cultures lost their sticky character, but regained it when again subcultured on the simple peptone agar.

The author concludes that these results reveal the existence of some physical difference between the strains of *melitensis* and *abortus*, but that this difference is one of degree and, in addition, requires a considerable time to demonstrate.

D. H.

MALPINE (James G.) & SLANETZ (Charles A.). **Studies on the Metabolism of the Abortus-Melitensis Group. 2. Further Observations on Nitrogen Metabolism. 3. Glucose Utilization.**—*Jl. Infect. Dis.* 1928. Jan. Vol. 42. No. 1. pp. 66–72. With 2 charts. [5 refs.] 73–78. With 1 chart. [5 refs.] [Storrs Agric. Experim. Station, Storrs, Connecticut.]

Forty-one strains were tested: 10 were *Br. abortus* of bovine origin, 10 of porcine, 10 of human and 11 were *Br. melitensis* strains.

By the methods employed it was shown that *Br. abortus* of bovine origin utilizes very little of the available glucose in its metabolic activity; on the other hand, *Br. abortus* of porcine and human origin and the strains of *Br. melitensis* utilized from 4 to 18 per cent. of this carbohydrate. By reason of this difference in the metabolism of sugar different amounts of the various nitrogen fractions are produced in culture media over an incubation period of 14 days. Indeed, the interesting point in these papers is that all the tests employed definitely divided the melitensis-abortus organisms into two groups—one group consisting of the *Br. abortus* of bovine origin and the other comprising *Br. abortus* of porcine and human origin and *Br. melitensis*.

It would appear that *Br. abortus* of human origin is more closely related to that of porcine origin than to the bovine variety; but it is possible that cows may on occasion be actually infected from pigs.

In view of the fact that certain strains of the abortus-melitensis group can utilize carbohydrate, the suggested name *Alcaligenes* for the group would appear to be erroneous.

D. H.

CERRUTI (Carlo F.). Ricerche comparative tra "*M. melitensis*" e "*B. abortus*" per mezzo delle rispettive agglutinine isolate. Considerazioni critiche. [**Comparative Research on *Br. melitensis* and *Br. abortus* by Means of Agglutination Tests.**—*Bol. d. Istituto Sieroterap. Milanese*. 1927. Dec. Year 6. Vol. 6. No. 6. pp. 425-440. [40 refs.] French summary pp. 438-439. [Hyg. Inst., R. Univ., Turin.]

The author discusses work done by EVANS and others and the attempts to differentiate between *Br. melitensis* and *Br. abortus*, attempts which have so far failed.

The author selected three strains of *melitensis* and three of *abortus*; the three latter were obtained from cow, pig and sheep and from a district where epizootic abortion was common but undulant fever in man so far had not been noted.

He used the method of HAHN and TROMMSDORFF, later modified by OGATA. In this the bacteria are agglutinated by immune rabbit serum, treated by a centinormal solution of caustic soda, then centrifuged and washed several times in 10 per cent. solution of saccharose. This solution, which now contains some of the agglutinins, is freed from the remaining bodies of the bacteria by centrifuging and rendered isotonic by the addition of NaCl. The fluid was then employed to carry out a series of agglutination tests with the six selected strains of *Br. melitensis* and *Br. abortus*, but these failed to show any difference between the two classes.

The author also tried to differentiate between his strains by means of the ordinary absorption methods of CASTELLANI, but here also he failed to make out any distinctive difference between his strains.

He suggests that the only difference between these microbes is that the one, *abortus*, Bang, 1897, causes abortion in cattle, pigs and sheep, undulant fever being absent or extremely rare; the other, *melitensis*, Bruce, 1887, causes undulant fever in man and may be found in animals closely associated with such cases.

D. H.

FAVILLI (Giovanni). Studi sui batteri "*Brucella melitensis*." Le varietà abortus, melitensis, paramelitensis e i loro reciproci rapporti. [**Studies on *Br. melitensis*, the Relations of abortus, melitensis and paramelitensis.**—*Bol. d. Istituto Sieroterap. Milanese*. 1927. Oct. Year 5. Vol. 6. No. 5. pp. 341-376. [31 refs.] German summary pp. 374-375. [Inst. Gen. Path. R. Univ., Florence.]

The author considers that the typical strains of the group Abortus-melitensis-paramelitensis, are those which are most sharply and clearly agglutinated by specific *melitensis* immune serum and are least susceptible to non-specific agglutination. The non-specific agglutination to which he refers is not group agglutination with sera

but agglutination by means of lactic acid, peptone and agglutination of emulsions by heat; this last test is the one on which he places most reliance, but all three tests have been largely used by Italian workers to separate the various members of the group.

Working on these lines Favilli finds that *abortus* is the most typical, *melitensis* comes next in order, and *paramelitensis* he regards as atypical. But he adds that owing to variations in the capacity for agglutination by immune sera and in non-specific agglutination of *melitensis*, no sharp line of demarcation can be drawn between the different strains, but rather there is a gradual, unbroken series commencing with the most "typical" *abortus* strains and passing on, through various intermediates, to the most atypical, i.e., *paramelitensis*, which is only slightly agglutinated by *melitensis* immune sera and is non-specifically agglutinated. In addition to this, and as a further complication, he finds that these characters are not fixed, and different strains which have at times been specifically agglutinable lose this property and may acquire the property of non-agglutinability; thus in his hands a *melitensis* strain may become indistinguishable from *paramelitensis*. This change, in the case of *melitensis*, may be spontaneous or can be produced artificially by subjecting strains of *melitensis*, and also of *abortus* to cultivation in the presence of immune serum.

By this process, to which he gives the name "serumization of broth cultures," he has succeeded in producing cultures of *abortus* and *melitensis* which are no longer agglutinable by specific serum and have acquired the property of non-specific agglutination.

The characters conferred by the action of immune serum are stable and transmissible through an indefinite number of passages.

The reason given for regarding *abortus* as being the type organism is that it is stable, i.e., does not become spontaneously atypical, although *abortus* strains do become so under the stimulus of serum. *Melitensis* is unstable in the direction of *paramelitensis*, which is atypical and stable.

The author is of opinion that the result of his work which has been confirmed by other Italian workers, is to suggest that this group is unstable but is homogeneous.

D. H.

BONCINELLI (Umberto). Modificazioni osservate in stipiti di *Br. melitensis* ripetutamente coltivati in brodo. [**Changes seen in Strains of *Br. melitensis* Repeatedly cultivated in Broth.**].—*Bol. d. Istituto Sieroterap. Milanesc.* 1927. Oct. Year 5. Vol. 6. No. 5. pp. 377-386. [15 refs.] German summary p. 385. [Inst. Gen. Path. R. Univ., Florence.]

The general idea in this paper is to show that the so-called *melitensis* and *paramelitensis* strains of *Br. melitensis* are not possessed of definite fixed characteristics, but as a sequence to the action of various agents can present modifications which can be transmitted in successive generations. If sub-cultures are made in broth from the sediment of a broth culture of *melitensis* of 5-7 days' growth, and this operation is repeated several times (from 5 to 15 transplants), a culture is finally obtained with all the characteristics of those of bacteria usually labelled *paramelitensis*. The same thing happens—although a greater number of passages are required—if one starts the sub-cultures from the supernatant fluid instead of from the sediment. The new characters of the *paramelitensis* so produced are fairly stable but may show some variation.

These facts, considered in connexion with the reports of other writers on the same subject, reinforce the opinion, already arrived at by FAVILLI by other methods, that *melitensis* and *paramelitensis* are at the extremes of a succession of forms closely related and linked up by a series of intermediate forms and belong to one definite bacterial species.

D. H.

OROYA FEVER AND VERRUGA PERUANA.

RIBEYRO (R. E.). Sur la verruga peruana. Unicité ou dualité? [**Verruga Peruana—One Disease or Two?**]*—Bull. Soc. Path. Exot.* 1927. Oct. 12. Vol. 20. No. 8. pp. 790-800. [11 refs.]

The author points out that up to the date of the expedition to South America (1915), of which Dr. STRONG was the leader, Oroya fever and verruga peruana were looked upon as one and the same disease, or rather as separate manifestations of the same disease. CARRION in 1885 inoculated himself with some material from the eruption of a mild case of verruga and contracted Oroya fever, from which he died. STRONG and his collaborators came to the conclusion that they were distinct diseases, for the following reasons:—

They successfully inoculated verruga from man to man and from man to experimental animals, and they were unable to obtain cultures of the organism, *Bartonella*, from the eruption of verruga peruana. Immunity experiments which were carried out appeared to support their view.

Ribeyro points out that the Strong expedition was not in the country for very long and saw only a small number of cases.

In a study of a large number of cases all types are met with, from the simple afebrile case of verruga to the fulminant type of fever with a pernicious type of anaemia, which is invariably fatal and does not go on to the verruga stage at all. On the other hand, in cases of Oroya fever which are not fatal convalescence is ushered in by the appearance of the verruga stage. In both types the *Bartonella* organism can be seen; in the mild type very few, it is true, but in the severe type in enormous numbers in the blood cells. The organism has been cultured from both types.

Verruga peruana is found only in certain definitely circumscribed districts of Peru and Oroya fever is identical in its geographical distribution. It is necessary to stay at least one night in such districts to contract the disease; journeys by day can be made with impunity.

It has also been noted that persons who have contracted verruga do not suffer from a second attack, nor do they subsequently contract Oroya fever, and *viceversa*. Also BATTISTINI has succeeded in producing the verruga eruption in monkeys inoculated with blood from cases of Oroya fever.

In view of the work of the older physicians and of recent experimental work, Ribeyro is convinced that verruga peruana and Oroya fever are manifestations of one and the same disease.

D. Harvey.

MAYER (Martin) & KIKUTH (Walter). Zur Aetiologie und Einheit der Verruga peruviana und des Oroya fiebers. [**Aetiology of Verruga Peruana and Oroya Fever. Their Unity.**]*—Abhandl. a. d. Gebiet d. Auslandskunde. Hamburg. Univ.* 1927. Vol. 26. (D., Med. & Vet. Vol. 2). [Festschrift NOCHT.] pp. 319-327. With 6 figs. on 2 plates. [17 refs.] [Inst. for Ship & Trop. Diseases Hamburg.]

In 1913 the senior author with ROCHA LIMA and WERNER transmitted verruga to monkeys [see Vol. I of this *Bulletin*, p. 727]. The inoculations were made above the eyebrow, and a single lesion resulted. In

1926 a sailor infected with verruga was admitted to the hospital of the Hamburg Institute and formed the subject of further experiments. The man had malaria parasites in his blood and on both legs several nodules of the size of linseeds or hazelnuts, moveable with the skin, not tender, of bluish sheen. On April 12th two nodules were removed, another on May 6th, and a fourth on May 18th. All were pronounced by ROCHA LIMA to be verruga nodules. The man had left his ship in Peru, wandered inland and been employed on a Peruvian railway, where he had been freely bitten by mosquitoes. The material removed served for microscopic examination and animal experiment.

The earlier experiments were fully confirmed. The nodule removed on May 6th gave rise to 4 passages in monkeys, when the last animal died with severe anaemia; that removed 12 days later gave rise to infection now in the 12th passage (1½ years). The papules which developed are described; they never occurred elsewhere than at the site of inoculation. Some of the experimental animals had their spleens removed before or after the inoculation with the object of seeing whether, as in the case of infectious anaemia of rats, general infection would be induced and Oroya fever develop; the operation was well borne. Twice occurred severe anaemia with fever and Bartonella in the blood and, in 3 cases, Bartonella appeared in the blood sparingly. Protocols of these 5 experiments are given; in all but one the spleen had been removed. Direct inoculation of Bartonella-containing blood was always negative. Of the monkeys employed the cynopithecus and mangabey yielded the largest papules, the Javanese monkeys the smallest.

In 1913 the senior author and his colleagues found in the spindle-cells (angioblasts) of ROCHA LIMA characteristic cell inclusions, brought out by various staining methods. With Giemsa the inclusions appeared brick red and consisted of a countless number of minute roundish bodies closely apposed. These observations have hitherto not been confirmed. In the fresh material, from man as well as from monkey, they were now elaborated and extended. To get good smears small pieces of the very tough material must be teased out with needles or fine forceps; the cells are often destroyed but the inclusions lie beside the nucleus. A rod-like appearance was not seen in the smears, but the size of the bodies corresponded with that of the roundish Bartonella forms. The inclusions were recognized also in sections and their restriction to the angioblasts was evident. The authors received preparations from NOGUCHI and a copy of his paper on the production of verruga nodules with cultures of Bartonella from Oroya fever [see this *Bulletin*, Vol. 24, p. 622]; he suggests that the reddish granules represent intracellular forms of *Bartonella bacilliformis*. The authors are convinced of the aetiological connexion of these inclusions with verruga. Doubtless, they write, they represent the form of the virus which determines the tumour formation of the verruga nodule. They are uncertain whether these are the primary stages from which free Bartonella develops or whether Bartonella which have penetrated the angioblasts there multiply; possibly they represent "intracellular cultures."

With Bartonella-containing blood of two monkeys the authors tried, intracutaneously, subcutaneously, by scarification and intravenously, to infect fresh monkeys. There was no single success, either local or general. The authors recall that STRONG and his colleagues failed to infect animals with Oroya fever blood. They have examined NOGUCHI's records and find that with one exception all his successes

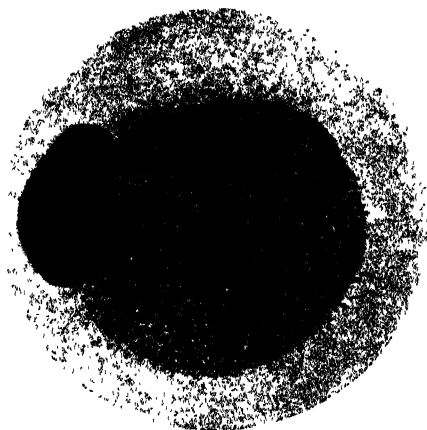
were obtained with juice from a nodule or with cultures; the blood from which the cultures were obtained did not infect. Perhaps not all stages of *Bartonella* are transmissible or certain disturbances of the organism, such as malaria, must precede infection. The significance of the infectious anaemia of rats which only appears after splenectomy and is due to a *Bartonella* is obvious here. At any rate the experiments, like those of NOGUCHI, show that purely local inoculation of verruga material into the skin may give rise to a fatal infection of Oroya fever.

NOGUCHI and BATTISTINI succeeded with ease in getting cultures from both Oroya fever material and from tissue and blood of verruga material, with such ease that for diagnosis NOGUCHI prefers this procedure to blood examination. The authors, following their technique exactly, failed except in one instance. Perhaps the cultivability of strains varies.

A. G. B.

DA CUNHA (A. M.) & MCNIZ (Julio). Recherches sur la verruga peruana expérimentale. [**Experimental Verruga Peruana.**]—*C.R. Soc. Biol.* 1927 Nov. 18. Vol. 97. No. 31. pp. 1368-1372. With 3 text figs. Oswaldo Cruz Inst., Rio de Janeiro.

This is an account of some experimental work done with a culture of *Bartonella bacilliformis* received from Professor NOGUCHI. Intra-dermal inoculations were made in two places on the right supra-orbital ridge of a monkey (*Pseudocercus* sp.) and subcutaneously in the thigh; 0.1 to 0.2 cc. of the 12-day old culture was used, the third passage made in the Institute from the original culture. A little of the same culture was rubbed into a scarified area on the left supra-orbital ridge of the same monkey.



Drawing of multiplication of *Bartonella* in an endothelial cell.
[Reproduced from *Comptes Rendus des Séances de la Société de Biologie*]

On the 10th day two small nodules appeared on the right supra-orbital region. Blood culture was negative, and there was only a slight rise of temperature lasting one day. The animal was killed on the 22nd day. There was a nodule the size of a small nut over the site of the subcutaneous inoculation and several small nodules on the scarified area. Cultures of *Bartonella* were obtained from punctures on the

nodules, but blood cultures taken at the post-mortem were negative. Material was taken from the nodules and from various organs for section and smears were also made and stained by Giemsa. In these smears many endothelial cells were seen, the protoplasm of which was crammed with masses of small corpuscles, either granular or, in some cases, showing as small bipolar-staining rods. These bacillary forms could also be seen singly in the plasma and occasionally in small masses surrounded by a pale-blue cytoplasm, representing the remains of a disintegrated cell. None of these rods were seen in the red cells.

These cell-inclusions are similar to the bodies described by MAYER, ROCHA LIMA and WERNER in verruga, and considered to belong to the Chlamydozoa; others are identical with the bodies described by STRONG in the blood of cases of Oroya fever and considered by him to be multiplication forms of *Bartonella*.

The authors agree with STRONG, but consider that these bodies are allied rather to *Rickettsia* than to the Haemosporidia, such as *Theileria*.

D. H.

GALLIARD (H.) & ROBLES (R.). Inoculation de la verruga au singe *Cynomolgus (cynomolgus) fascicularis* avec des cultures de *Bartonella bacilliformis*. [**A Monkey infected with Verruga by Cultures of *B. bacilliformis*.**—*Ann. Parasit. Humaine et Comparée*, 1928 Jan. 1. Vol. 6. No. 1. pp. 1-3. With 1 text fig. [5 refs.] [Lab. Parasit., Faculty of Med., Paris.]

One of the authors received from Professor NOGUCHI a culture of *Bartonella bacilliformis* originating from a case of Oroya fever and brought it to Professor BRUMPT in Paris.

Direct examination of this culture revealed nothing, even by dark-ground illumination. But inoculation of a scarified area on the supra-orbital region of *Cynomolgus* produced, after an incubation period of 21 days, a typical verruga lesion. At the same time a subcutaneous injection was made into the umbilical region and fever resulted 9 days after the inoculation. *B. bacilliformis* was not found in the blood.

This confirmed results previously obtained by NOGUCHI in America, namely that a culture of *Bartonella* isolated from a case of Oroya fever, if simultaneously inoculated under the skin and rubbed into a scarified area of the skin of a monkey, produces both a typical verruga lesion and also a fever, with anaemia, resembling Oroya fever.

D. H.

NOGUCHI (Hideyo). **Etiology of Oroya Fever. X. Comparative Studies of Different Strains of *Bartonella bacilliformis*, with Special Reference to the Relationship between the Clinical Types of Carrion's Disease and the Virulence of the Infecting Organism.**—*Jl. Experim. Med.*, 1928. Feb. 1. Vol. 47. No. 2. pp. 219-234. With 4 plates. [9 refs.] [Rockefeller Inst. for Med. Research, New York.]

This paper consists of a study of nine strains of *Bartonella bacilliformis* isolated from the blood of cases of Carrion's disease (verruca). The blood samples were sent to the Rockefeller Institute in New York by Dr. LORENTE, Director of the National Institute of Public Health, Peru.

Twelve samples in all were sent, but three were found to be contaminated. Eight of the cases from which the blood was taken had verrucous eruptions and three had fever and marked anaemia without eruption; one had neither fever nor eruption, but extreme anaemia. All the strains isolated were gram-negative and stained best with Giemsa's solution. The number of flagella varied among different strains, some showing a single flagellum, others as many as four. In all instances, however, the flagella were unipolar.

The original blood specimens received were used to inoculate two monkeys: specimens 1 to 6 gave no local lesion, but a positive blood culture was obtained from both animals inoculated. Of the nine successful cultures tested, six possessed definite specific pathogenicity for monkeys; the other three were non-pathogenic. The three non-virulent strains (which had yielded successful culture) came from cases of benign miliary or nodular verruga and in only one of these were *Bartonella* seen in the blood sample. The six pathogenic strains came from patients whose blood showed numerous *Bartonella* and who also had profound anaemia. That is, although it was possible to isolate *Bartonella* by culture in semi-solid media from cases of Oroya fever and also from mild verruga, yet the strains isolated from the former were pathogenic for monkeys, whereas the strains from the latter were not.

In highly susceptible animals the virulent strains may produce in monkeys a condition resembling Oroya fever and in more resistant animals verruga only. The same factors of virulence of the organism and varying susceptibility in man may account for the different clinical pictures met with in cases of the disease.

D. H.

NOGUCHI (Hidéyo). **Etiology of Oroya Fever. XI. Comparison of *Bartonella bacilliformis* and *Bartonella muris*. Cultivation of *Bacterium murium*, n. sp.—*Jl. Experim. Med.* 1928. Feb. 1. Vol. 47. No. 2. pp. 236-243. With 2 plates. [9 refs.] [Rockefeller Inst. for Med. Research, New York.]**

MAYER has reported that the blood of splenectomized rats and mice showed the presence of an organism resembling *Bartonella bacilliformis*, and he gave the name *Bartonella muris* to this organism.

Noguchi compared these two organisms. He found that *Bart. muris* appeared in large numbers in the blood of white rats, wild rats, white mice and hamsters after removal of the spleen, but did not appear in the blood of monkeys, rabbits or guineapigs under the same conditions. It was not found possible to transmit *Bart. muris* to normal animals by injection of blood from splenectomized animals.

During the course of these experiments a small micro-organism was isolated in pure culture which caused orchitis in rats. This organism, although resembling *Bart. muris* in many respects, could not be definitely identified with it and therefore has been given the name "*Bacterium murium*."

Bartonella bacilliformis and *Bartonella muris* have distinctive morphological features, as also has *Grahamella talpae*, the last being the name given to cell-inclusions in the blood of the English mole, first described by GRAHAM of Cambridge.

D. H.

NOGUCHI (Hideyo). **Etiology of Oroya Fever. IX. *Bacterium peruvianum*, n. sp., a Secondary Invader of the Lesions of Verruga Peruana.**—*Jl. Experim. Med.* 1928, Jan. 1. Vol. 47. No. 1. pp. 165–170. With 4 figs. on 1 plate. [3 refs.] [Rockefeller Inst. for Med. Research, New York.]

The author in investigating the causal organism of verruga (Carrion's disease) examined two subcutaneous nodules, excised under aseptic conditions, received from Professor HERCELLES of Lima. A strain of *Bartonella bacilliformis* was isolated from one of these, but in addition another organism which resembled *Bartonella* morphologically but showed marked differences in cultural and pathogenic properties.

This organism grew well on ordinary culture media at 25° C., colonies appearing in 24 hours on agar; on blood-agar plates haemolysis took place. A diffuse growth occurred in broth, and after a few days a distinct pellicle appeared. Serum was liquefied after about two weeks at 25° C. No carbohydrates were fermented. The organism was actively motile. Spirally-curved flagella, two to four in number, were seen to be attached at one pole. In this peculiarity it resembled *Bartonella bacilliformis*. It was Gram-negative, but stained with carbolfuchsin or methylene blue.

Intradermal injection of the bacterium gave rise to small necrotic areas which ulcerated and healed up again within 10 to 14 days, unbroken nodules may also be found. Intravenous or intratesticular injection caused a fatal septicaemia in rabbits, guinea-pigs, rats and mice. *Post-mortem* the most striking feature was a marked parenchymatous degeneration and necrosis of the liver.

This organism which in some particulars—possession of unipolar flagella, non-Gram staining, no sugars fermented—resembled *Bartonella*, differed from it in growing readily on ordinary solid and fluid media and in its pathogenicity for animals.

In view of the fact that so far as can be ascertained, it has never before been met with, Noguchi regards it as a new species and has named it "*Bacterium peruvianum*."

D. H.

WEISS (Pedro). **Hacia una concepción de la verruga peruana. [A New Conception of Verruga Peruana.]**—*An. Facul. de Med.* Lima. 1928. Vol. 9. Nos. 4, 5 & 6. pp. 279–299. With 2 plates.

This is an interesting article linking up on immuno-biological principles the close connexion between Oroya fever and Verruga. The author maintains that the disease intimately concerns the reticulo-endothelial system, and that the reaction of this follows immediately on the haematic crisis, the eruption of verruga being the histioid result [if one may use the term] of allergy. In other words, at the termination of the haematic phase, the virus becomes fixed in the tissues and the histioid reticulo-endothelial reaction so produced leads after a varying interval to the production of the verruga nodules. The reaction is evidenced by destructive lesions in the endothelial cells of special function (vascular endothelium *sensu stricto*) with consequent formation of haemorrhagic foci, infiltration of leucocytes, and, in variable degree, proliferation of the perithelial cells; this corresponds to the petechial eruption which sometimes precedes the verruga eruption *p. oper.* In addition to this there is proliferation in certain spots of carminophil or unspecialized haemohistioblastic cells, particularly in the lax connective tissue. Thus, the verruga nodule, formed by proliferative

reaction of the angioblastic or reticulo-endothelial cells, partakes of the character of an allergic reaction. The difference between the classical conception and that of the author may be schematically represented thus :

Classical.

Oroya fever — Calm Interval — Macroscopic eruption of Verruga.

Author's.

Haematic Phase (Oroya fever).

Histioid Phase.

(1) Invasion—(2) Crisis—(3) Remission—(4) Reaction with—(5) Reaction
out eruption. with eruption.
H. Harold Scott.

HERCELLES (Oswaldo). El germen de la verruga peruana. [**The Organism of Verruga Peruana.**].—*An. Facul. de Med. Lima*. 1926. Vol. 9. Nos. 4, 5, & 6. pp. 231-264. With 5 coloured plates.

The author reviews the question of the causative organism of Oroya fever and of Verruga peruana and gives a detailed account of his investigations and cultural findings.

In peptone broth to which the blood of a patient has been added the medium remains clear, but microscopical examination reveals small actively motile coccoid bodies, 0.2-0.5 micron in size, in two days, becoming more numerous, aggregated, and losing motility by the fourth to the fifth day. Subculture into various media—broth, agar, glucose-agar, lactose-agar, gelatin, etc.—gave negative results, but with human blood and rabbit testis the same bodies were found to grow. Identical results were obtained with material from the nodules of verruga as from the blood of a febrile case. Growth occurs at 37° C. and is most profuse above the level of the sedimented red corpuscles in a whitish granular stratum. By the 8th day this has increased greatly and a pellicle or zoogloea forms, though the medium itself remains clear.

In the course of his summary the author shows that he made a definite communication of his results to the Faculty of Medicine on September 30th, 1925, and therefore claims priority for the discovery. He also states that the fact of his obtaining the same growth from the blood of febrile cases and from the verruga nodules shows the two to be manifestations of one and the same disease; thirdly, the bacillary form is but a stage, the intracorpuseular form of that found in the peripheral blood, and the organism should therefore be called *Bartonella coccoides* rather than *Bartonella bacilliformis*.

H. Harold Scott.

DENGUE AND UNCLASSED FEVERS.

PIROT. Note sur quelques essais thérapeutiques dans la dengue. [**Some Therapeutical Trials in Dengue.**].—*Arch. Méd. et Pharm. Nav.* 1927. Oct.-Nov.-Dec. Vol. 117. No. 4. pp. 281-286. [6 refs.]

The author had come to the conclusion that the usual drugs employed in dengue (quinine, intestinal antiseptics, etc.) were of little use. It

happened that a patient under treatment for syphilis by novarsenobenzol developed dengue the day after he received a dose of 0.45 gm. of the drug. The disease was in no way aborted; the only difference noted was that the rash was unduly marked.

Seventeen cases of dengue were treated with an intramuscular dose of 6 centigrammes of sulpharsenol on the first three days of the disease. In 9 there was a marked reduction in the temperature and no relapse, and decided amelioration of the joint and bone pains. In the other 8, the fever was of shorter duration than in the controls, and, although there were relapses, they were not so severe as in the untreated cases.

Treparsol by the mouth was also tried—1.0 gm. *per diem* for the first three days. Although the disease was not cut short by this drug, yet there was undoubted amelioration of all the symptoms—fever, back-ache, etc. Stovarsol was also used in the same manner, but in too few cases to give any opinion. The two methods—sulpharsenol by the intramuscular route and treparsol by the oral—were combined, with good results.

The best results of all, however, were obtained by the injection of 3 cc. of acetylarsan hypodermically. If given about the second or third day this drug, in the author's hands, aborted the fever, and he is of opinion that it is worthy of further trial.

D. Harvey.

KHOURI (J.). Quelques observations parasitologiques et biochimiques concernant l'urine dans le fièvre "dengue." [**Some Observations on the Urine of Cases of Dengue.**—*Bull. Soc. Path. Exot.* 1928. Feb. 8. Vol. 21. No. 2. pp. 92-94.]

This investigation was carried out during the epidemic of dengue in Egypt between June and December, 1927. The cases were clinically typical of dengue. A search was made in the urine for the parasite of the disease. The urine was taken at or near the end of the pyrexia, centrifuged and the deposit stained by Fontana's method and examined. In two cases a few spirochaetes were found and these resembled in every particular the spirochaetes isolated by CORRY from the blood of cases of dengue in Beyrout in 1921 [this *Bulletin*, Vol. 20, p. 384.].

It has been stated that albuminuria does not occur in dengue as a rule; the author found it present in a number of the cases, but only as a "trace." In one or two cases also tube-casts were seen, both granular and epithelial. Bile-pigments were variable in amount and the diazo-reaction was found positive in some cases, even in the apyrexial period. As regards the variation of the normal constituents of the urine, there was an increased elimination of phosphorus; the urine remained acid in reaction; there was a relative increase of the ammonia content and often a marked diminution of the amount of nitrogen.

D. H.

CAWSTON (F. G.). **Dengue Fever and Defective Gutterings.**—*Jl. Trop. Med. & Hyg.* 1927. Nov. 1. Vol. 30. No. 21. pp. 276-277.

The author points out that defective gutterings on houses may and do provide breeding places for mosquitoes. To provide against this he urges that in places where mosquitoes are prevalent bye-laws should be introduced to prevent the erection of houses without a sufficient

slope on the gutterings. He suggests a slope of 1 inch in every 12 feet, or 2 inches from each end of a 48 feet wall. To prevent splashing he recommends that the gutterings should be broader at the lower end. In such districts there should also be a down-pipe to every 24 feet of eaves-piping, thus ensuring efficient drainage.

D. H.

LEFROU (G.). Pseudo-dengue ou fièvre rouge congolaise. Considérations générales sur les fièvres éruptives tropicales. [**Pseudo-Dengue or Red Congolese Fever.**]*—Bull. Soc. Path. Exot.* 1927. Oct. 12. Vol. 20. No. 8. pp. 779-790. [13 refs.]

The author describes a case of fever, in French West Africa, in a European adult female, with a generalized morbilliform eruption, diagnosed in the first instance as measles by the embarkation medical officer. In 48 hours the eruption disappeared without desquamation. The rash had appeared suddenly after some days of indefinite malaise and vague pains in the arms and legs, without coryza, sore throat or the severe joint pains of dengue. Twenty days later a second identical case was observed, and twenty cases in all during the year have come under the author's observation. There is a moderate degree of fever, not exceeding 38.5° C. even at night, and nothing remarkable about the pulse rate. In one case only, an enlargement of the post-auricular and cervical glands was noted; in all other cases, although carefully sought for, no such enlargement could be made out, an observation which, in the author's opinion, excludes rubella. The eruption invariably disappeared in 48 hours. Convalescence was rapid and relapses were never noted. One similar case was noted in a native; probably other natives did not consider the illness worthy of report.

The author discusses the differential diagnosis. Is this disease German measles, dengue or another disease altogether? The main points of difference between this disease and German measles is the long period of malaise before the rash appears, the rapid disappearance of the rash and the absence of enlargement of glands. Koplik's spots were never seen. Dengue, on the other hand, occurs in epidemics, whereas cases of this disease occurred singly at intervals of weeks. The joint pains of dengue are much more severe than the mild discomforts of the exanthem under discussion. In dengue the fever is higher and relapses are common and desquamation is the rule. The author, however, stresses the point that the clinical descriptions of different epidemics of dengue vary in a remarkable degree; yet they have one point in common—their epidemic character. CLAPIER has noted a similar fever in French West Africa [see this *Bulletin*, Vol. 19, p. 66].

Having eliminated rubella and dengue as possible diagnoses, the author rejects the name "pseudo-dengue" and prefers the original term—"fièvre rouge Congolaise"—for this malady.

D. H.

LEGENDRE (J.). A propos de la fièvre rouge congolaise. [**Red Fever of the Congo.**]*—Bull. Soc. Path. Exot.* 1928. Jan. 11. Vol. 21. No. 1. pp. 18-20.

This article is a trenchant criticism of the contention of LEFROU that "fièvre rouge congolaise" is a separate and distinct disease. In Legendre's opinion it is simply mild sporadic dengue.

Some of his criticisms are very apt. Such as, "it is not necessary to measure the facial angle or to examine the blood of a Chinaman to tell

him from the local negroes." "To call '*Stegomyia fasciata*' '*Aedes argenteus*' is not to create a new species of mosquito." "Because a man is small or even a dwarf it is not necessary to put him in a different race from that to which he apparently belongs."

With regard to LEFROU's argument that dengue occurs only in epidemic form, he points out that in the prevention of disease it is the sporadic cases and the first cases of an epidemic which present difficulty. He also quotes the opinion of a colonial medical officer of 25 years' experience, who says, "dengue is common; if you look for the rash you will find it."

D. H.

BURNET (Et.) & OLMER (D.). La maladie de Marseille (fièvre exanthématique de nature indéterminée) est-elle la même maladie que la maladie de Brill (typhus bénin) et le "typhus tropical"? [**Is Marseilles Fever the Same Disease as Brill's Disease and Tropical Typhus?**]*—Arch. Inst. Pasteur de Tunis.* 1927. Dec. Vol. 16. No. 4. pp. 317-332. [9 refs.]

Since 1922 many cases of an exanthematous fever of undetermined nature have been reported in Marseilles. Clinically these cases resemble mild typhus (Brill's disease) and the fever described by FLETCHER in Malaya and named tropical typhus; it also resembles the latter in the complete absence of lice from the patients.

The authors remark that if this disease is really Brill's disease, as has been suggested, then one should get a positive Weil-Felix reaction, and inoculation of the blood of cases into monkeys or guineapigs should produce the specific typhus reaction.

In Brill's disease and in tropical typhus the reaction of Weil-Felix is in the great majority of cases positive; 93 per cent. is the figure given by MAXCY for cases of Brill's disease in the Southern States of America. In the Australian cases it is stated that the result is "invariably positive." FLETCHER also found it positive in his cases, but not with all strains of *Proteus*.

In view of these results, how does the Marseilles disease compare as regards the Weil-Felix reaction? So far the results have been invariably negative. Burnet investigated the strain of *Proteus* employed to carry out the reaction and found that it was readily agglutinated by the serum of a case of true typhus. He also tested the serum of two cases of the Marseilles fever against his stock strain of *Proteus* and both gave negative results. However, some further trials made with sera taken later in the disease and with other strains of *Proteus* have, in the hands of LEGROUX and TEYSSONNIÈRE, given ? positive results.

Burnet criticizes these results and points out that only the cases A, B and C could by any means be considered positive, and even these cases can only be accepted with reserve. For instance, the strain "Constantinople" is agglutinated by serum B and not by A, whereas the strain H2x (Polish) is agglutinated by sera A and 6 and not by serum B; and there are other anomalies.

Experimental inoculations.—The blood of a case of Brill's disease if inoculated intraperitoneally into a guineapig produces after an incubation period of 8-10 days the characteristic fever. So far not many attempts have been made to inoculate the blood of the cases of Marseilles fever into animals, but the few that have been carried out have all been negative.

Réactions pratiquées à Marseille (Dr. Teyssonière).

Sujets	Taux	Souches de Paris.					Souche Mar- seille	Souche de Con- stanti- nople	Souche Par
		O x 19	H2 x	H x 19	x 19 Job	x 19 Syrie			
A Sérum pré- levé au 3e jour de l'apyrexie	1/125	+++	+++	+++	+++	+++	+++	O	+++
	1/250	++	++	++	++	++	++	O	+++
	1/500	+	+	+	+	+	+	O	++
	1/1.000	±	±	±	±	±	±	O	+
B au 20e jour de la con- valescence	1/125	+++	O	+++	++	±	O	+++	+++
	1/250	+++		++	±	O	O	+++	+++
	1/500	±		+	O	O	O	++	++
	1/1.000	±		O	O	O	O	+	+
C au 10e jour de la maladie	1/125	O	O	O	O	O	O	O	O

1. Le sérum du même malade, prélevé un mois après l'entrée en convalescence n'a donné à 1/50 qu'une agglutination partielle. A considérer comme négatif.

Réactions pratiquées à Paris (Dr. Legroux)

Cas	Souches				
	x 18 S	x 19 M	H x 19	O x 19	x 2 H
1. — 12e jour à la fin de la période d'état	O	O	O	1/50	1/50 ?
2. — 10e jour, temp. 39'	O	O	1/50 ?	1/50	O
3. — 12e jour	O	O	O	1/50 ?	1/50 ?
4. — Fin de la période d'état...	O	O	O	1/50 ?	1/50 ?
5. — Fin de la période d'état...	O	O	O	1/100 ?	O
6. — 1er jour d'apyrexie, 14e jour de la maladie	1/100	1/100	1/100	1/100 partiel à 1/500	1/100

Souche S	provient de cas orientaux (Syrie)
— M	— Europe centrale
— H	— Russie (pandémie 1919)
— O	— typhus de Pologne
— 24	

But the authors point out that this negative response to inoculations in the guineapig is not absolute proof that the disease is not typhus, for the reason that occasionally true typhus may be inoculated into a guineapig without producing any fever ("typhus inapparent," cryptic typhus); but if this animal is killed and another guineapig inoculated with an emulsion of the brain, this second animal will show the typical fever curve ("typhus apparent").

Thus if the blood of a case of fever suspected of being typhus is inoculated into a guineapig without any result, and a second guineapig is inoculated from the first again without result, typhus may be excluded.

The authors carried out experiments with the blood of the Marseilles cases and found that inoculations did not give rise to fever in animals, nor did inoculations from these animals to other animals give rise to any reaction.

Immune reactions.—Animals which have had a febrile reaction as the result of inoculation of the blood of cases of Brill's disease do not react when subsequently reinoculated with the blood of true typhus cases, and *vice versa*. But guineapigs which had been inoculated with the blood of Marseilles cases when subsequently inoculated with the blood of cases of true typhus gave the typical reaction, showing that the first inoculation had not been made with typhus blood.

In conclusion the authors say that they are not so far prepared to give a categorical "yes" or "no" to the question, Is Marseilles fever identical with Brill's disease? Before such an answer can be given further work is necessary, and they give the following suggestions for further research.

Clinical.—A careful survey to be made of the symptoms and a comparison of these with the symptoms of typhus and Brill's disease.

Epidemiology.—Careful search for lice [MACARTHUR has pointed out that head lice are very apt to be overlooked]. Enquiry to be made as to the occupation of the patients—does their work bring them into contact with grain, or cattle, rats, or mice, or biting insects?

Weil-Felix reaction.—Test sera taken after the 14th day of fever, also sera of convalescents up to several weeks after the fever has gone. The strains of *Proteus* used should be carefully selected, of a known titre of agglutination with typhus serum and not affected by sera of cases of other febrile conditions, such as typhoid.

Experimental inoculations.—Monkeys or guineapigs to be used in the first instance, then rats and mice. Careful estimations of the temperature of the guineapigs to be carried out for at least 20 days after inoculation. As the virus of typhus is scarce in the blood of experimental animals, it is preferable to use an emulsion of brain when inoculating one animal from another; also, if there are fatal human cases, animals should be inoculated from these with brain emulsion. If inoculation of the blood or brain emulsion from a case of fever is negative, it is necessary to inoculate a second guineapig from the first to exclude "typhus inapparent." If the second guineapig gives a typical reaction then the case is one of typhus, but if negative then typhus can be excluded, because one never sees "typhus inapparent" in two guineapigs in series.

Immune reactions.—After an inoculation guineapigs should be retested not later than 4 to 8 weeks. If a negative result is got with the inoculation of the blood of a case of fever into a guineapig, then if this same guineapig is tested four weeks later with the blood from a case of true typhus fever, whether the result is positive or negative it proves that the first case was not typhus.

D. H.

BOINET & PIERI (Jean). Epidémies d'exanthème infectieux de nature indéterminée observées sur le littoral méditerranéen. [*Epidemics of Infectious Exanthem seen on the Mediterranean Coast.*]—*Bull. Acad. Méd.* 1927. Oct. 4. Year 91. 3rd Ser. Vol. 98. No. 31. pp. 173-182.

The authors consider that this disease belongs to the class of infectious exanthems. But it is apparently only mildly infectious, since more than one case is seldom notified in one household, and there is only one instance noted of marital infection.

The fever is met with in all social classes and, so far, neither lice, fleas nor any other vermin have been discovered on the patients and, in many cases, they could be definitely excluded. The Widal reaction is invariably negative for typhoid and no positive agglutination has been found for the meningococcus; this last reaction has been tested because there is a quite definite meningeal type of the disease with stiffness of the neck and Kernig's sign. In these cases the examination of the cerebro-spinal fluid was also negative. The Weil-Felix reaction in all cases so far tested has been negative.

A clinical description of the cases is then given. The onset is sudden, with headache, and the temperature rises rapidly to 40° C., remains at this level with slight remissions from about the 3rd to the 10th day, and then drops slowly to normal by the 14th to the 16th day. There is considerable abdominal discomfort with diarrhoea. A marked and constant feature is sore throat. General redness of the fauces and palate is noted and occasionally small ulcers on the pillars of the tonsils. The rash appears about the 3rd day of the fever, commencing on the lower limbs and spreading up the abdomen and chest and eventually covering the face. This rash consists of rose spots at first, later becoming violet in colour; but they are macules and not petechiae, and fade on pressure. The rash disappears about the 12th day.

Another and unique finding is a small zone of inflammation, in each case and in varying sites, and connected therewith inflamed lymph glands. These spots fade but leave a small black linear scar, to which the name "tache noire" has been given. It is suggested that they represent the site of an insect bite and are the points of entrance of the infection.

In the authors' opinion this disease is not mild typhus and they give the following reasons for arriving at that conclusion:—

1. Absence of lice.
2. Rash occurs on face and is macular, not petechial.
3. Digestive disturbances are marked.
4. No injection of conjunctiva.
5. Presence of "tache noire," which are not found in typhus.
6. Weil-Felix reaction negative.

Then follow descriptions of a series of cases.

NETTER, who took part in the discussion, considered that the "tache noire" might be the site of infection and compared it to the primary ulcer found in cases of tropical typhus, and suggested that these cases also might be caused by the bite of a larval mite. But the Weil-Felix reaction is usually positive in tropical typhus.

D. H.

CASTRONUOVO (Giovanni). Tifo eberthiano o febbre esantematica mediterranea? [**Enteric Fever or Exanthematic Mediterranean Fever?**]*—Riforma Med.* 1928. Jan. 16. Vol. 44. No. 3. pp. 50-51. [4 refs.]

The author discusses the condition which has been designated at different times "exanthematic Mediterranean fever," "Exanthematic fever of Marseilles," "Benign endemic Typhus" [? typhoid] and "Brill's disease." There are four important and fundamental characteristics of the disease: (1) The course of the fever resembles that of typhoid; (2) the flushed face and diffuse morbilliform rash are very

like the early symptoms of typhus ; (3) Blood-culture is negative, and lice, as transmitters, are absent ; (4) the disease is mild, terminating in recovery after a course not exceeding three weeks.

He relates the case of a young woman of 20 years who, when seen at the end of the second week of high temperature, presented the following symptoms : A diffuse rash made up of very numerous rose-violet spots, very slightly raised, 4-5 mm. in diameter, some on the face, few on the trunk generally, but densely aggregated over the hips, sacrum and pubes. It was not haemorrhagic, nor pruriginous, and it persisted till the end of the attack, beginning to fade on the eighteenth day without desquamation. There was pharyngeal congestion, a furred tongue, and not much meteorism, abdominal pain or diarrhoea. The conjunctivae were hyperaemic ; there were debility, slight bronchial catarrh, pulse a little rapid, not dicrotic, tremor of the hands, insomnia and mild delirium.

The results of laboratory examinations were : Haemoculture negative (at the end of the second week) ; no agglutination by the serum with *Br. melitensis*, *Br. paramelitensis*, *Br. abortus*, *Proteus X 19*, or *B. paratyphosus A* and *B. B. typhosus* negative 1 : 50, weak positive 1 : 100, definitely positive 1 : 200-1 : 600. Recovery was rapid after the fever subsided, in three weeks from the onset.

H. Harold Scott.

KATSURADA (F.) & YOSHINO (J.). Ueber zwei Fälle des sogenannten Fünftagefiebers in Japan. [**Two Cases of So-called Five Day Fever in Japan.**]—*Abhandl. a. d. Gebiet d. Auslandskunde. Hamburg. Univ.* 1927. Vol. 26. (D., Med. & Vet. Vol. 2.) [Festschrift NOCHT.] pp. 225-228. With 2 charts in text. [2 refs.] [Inst. & Hosp. for Ship & Trop. Diseases, Kobe, Japan.]

This is the fever known in the War as Trench Fever, of which a few cases have been described from Japan. The two cases, seen in the Sessin Hospital, were married women of 19 and 53 years. The first had 9 attacks of fever, at first at intervals of 10 days, later of 5 days, lasting as a rule 20-30 hours. Nausea and vomiting, headache and malaise were present. Large doses of quinine and salvarsan were without effect. The second case was more severe. A chart shows 4 sharp rises of temperature on the 16th, 21st, 26th and 30th of March. No such bodies as Rickettsia could be found in the blood, nor in the stomach cells of lice, but almost regularly in the blood small spindle-shaped bodies like the sporozoites of malarial plasmodia. Similar bodies were seen in inoculated guineapigs, rabbits, rats, dogs and pigeons. [In the conclusions these bodies are mentioned only in respect of rabbits.] The authors suggest that the causative agent should be looked for at an early stage of the infection.

A. G. B.

MACKENZIE (Louis H. L.). **Notes on Two Cases of Undiagnosed Fever.**—*Indian Med. Gaz.* 1927. Dec. Vol. 62. No. 12. pp. 699-700.

Case 1. A boy, aged 42 years, son of a British officer in the Gilgit Agency. The fever commenced suddenly on May 26th and on the following day a well marked petechial rash appeared, particularly on the forearms and legs, slightly only on face and chest. The child complained of pains in the limbs. On May 29th the rash was much more pronounced, especially on the face ; and there were some dark red blotches. On June 2nd it began to fade, with some brawny desquamation. No Koplik's spots ; convalescence rapid.

Case 2. Father of above on June 6th developed a similar fever, with rash, but not so marked. Yet the rash took 14 days to disappear.

Diagnosis.—Measles and chicken-pox were considered and ruled out on clinical and epidemiological grounds. Typhus was suggested; no history of tick bites could be obtained. There is no note of Weil-Felix reaction or presence of lice.

A native servant of the above went to his own village and 15 similar cases were recorded there with 8 deaths.

D. Harvey.

CAWSTON (F. G.). Aspects of Dengue Fever Prevention.—*Jl. Trop. Med. & Hyg.* 1927. July 1. Vol. 30. No. 13. pp. 171-172.

MAZZOLANI (D.). Epidemia di febbre dengue a Tripoli (Anno 1926).—*Riforma Med.* 1928. Apr. 23. Vol. 44. No. 17. pp. 489-493. [37 refs.]

JAPANESE RIVER FEVER.

LEWTHWAITE (R.). **Japanese River Fever.**—*Malayan Med. Jl.* 1927. Dec. Vol. 2. No. 4. pp. 145-148.

This is a résumé of a lecture delivered to the Klang Branch of the Incorporated Society of Planters on September 19th, 1927, and the subject was chosen because of the occurrence in Selangor of 4 cases of the disease. These 4 cases have already been described by FLETCHER of the Kuala Lumpur Institute for Medical Research [*ante*, p. 52].

The disease resembles the so-called tropical typhus except for the well-marked primary ulcer and the enlarged glands in the vicinity. This ulcer is the site of the bite of the six-legged larva of the red mite *Trombicula akamushi*. In the nymphal and adult stage the mite does not bite warm-blooded animals, preferring vegetable juices; but the larvae bred from these adults can be shown to be infective—that is, although the adults do not convey infection to man, they can and do pass it on hereditarily to the ova and larvae.

It has been shown that the natural host of this mite is the rat: as many as 100 have been found on one rat, usually on the inside of the ear. Similar mites have been found on certain birds, and it is possible that the disease may be carried in this manner from one district to another.

Prevention lies in extermination of rats and avoidance of bites by larvae by bathing and change of clothes.

D. Harvey.

VAN DRIEL (B. M.). Een merkwaardig geval van mijtekoorts. [**A Remarkable Case of "Mite Fever."**].—*Geneesk. Tijdschr. v. Nederl.-Indië*. 1927. Vol. 67. No. 5. pp. 667-674. With 1 chart in text.

Mite fever is a name coined by the author to indicate the disease, discovered by SCHÜFFNER in N.E. Sumatra and described by him under the name of "pseudotyphus." He was well aware of the close relation with the "Tsutsugamushi" and suspected the existence of acarid transmitters. WALCH afterwards described a number of *Trombiculae*,

some of which were shown to be the probable vectors of the disease. The article under review describes a case in a Javanese coolie conspicuous by the appearance (during the 2nd week of illness) of serious disturbance of the brain, rhythmic spasms in the muscles of the face and the extremities, resembling an acute attack of paralysis agitans and lasting for about a week. This disturbance was accompanied by an inflammation of a portion of the uvea of both eyes resembling neuroretinitis specifica. The patient recovered almost completely within 3 weeks.

N. H. Swellengrebel.

Erratum.

No. 1. p. 52. FLETCHER & FIELD (Tsutsugamushi Disease in F.M.S.) line 4 of abstract, for 1925 read 1915. [DOWDEN's paper was noticed in this *Bulletin*, Vol. 6, p. 316.]

YELLOW FEVER.

STOKES (Adrian), BAUER (J. H.) & HUDSON (N. Paul). **The Transmission of Yellow Fever to *Macacus rhesus*: Preliminary Note.**—*Jl. Amer. Med. Assoc.* 1928. Jan. 28. Vol. 90. No. 4. pp. 253-254.

This is the first account of studies on yellow fever carried out by the West African Yellow Fever Commission of the Rockefeller Foundation and contains the first definite record of the transmission of this disease to monkeys.

During an epidemic at Larteh, Gold Coast, six Indian crown monkeys (*Macacus sinicus*) were inoculated with blood from patients suffering from yellow fever. Five of these developed fever and died, and the other showed no sign of infection. Subinoculations were made into three other monkeys of the same species, and two developed fever from which they recovered, and the third was refractory.

Later experiments were made with *Macacus rhesus* and this species was found to be very susceptible to the infection. One animal inoculated with blood from a mild case died after 5 days. Subinoculations also proved positive, and this strain has been carried from monkey to monkey by the inoculation of blood or serum thirty times, with fatal infections in every case except one, when the animal recovered. In addition, 22 monkeys were infected by transmitting the disease from one animal to another by the bites of *Aedes aegypti*.

These mosquitoes invariably became infective when fed on infected monkeys on the first or second day of the fever. The minimum incubation period has not been determined, but mosquitoes are certainly infective on the 16th day and remain so until death. One mosquito produced a fatal infection in two monkeys 85 and 91 days respectively after it had been infected by feeding.

In one experiment the virus was not transmitted to the offspring of infected mosquitoes.

The serum of infected monkeys filtered through V and N grades of Berkefeld filters and also through the Seitz asbestos filter produced fatal infections.

0.1 cc. of convalescent serum from a patient who suffered from a severe attack of yellow fever, protected monkeys against fatal doses of infected blood and also against the bites of infected mosquitoes.

The course of the disease in monkeys generally consists of an incubation period of 2-6 days and fever of from 104°-105° F. for 1-5 days, followed by collapse and death. During the febrile period bile, albumin, and granular and hyaline casts appeared in the urine and finally bile was present in the serum. Spontaneous bleeding of the gums was seen occasionally.

The pathological changes observed in infected monkeys agree with those occurring in human cases of yellow fever. Cultures of the blood in various media, including those for leptospira, have been uniformly negative and no leptospira have yet been observed in any of the tissues of infected monkeys.

Two other strains of yellow fever from Europeans who died from the disease were transmitted to monkeys and one of these has also been transmitted by means of mosquitoes.

[This important paper acquired a tragic interest, for one of the authors, Dr. Adrian Stokes, fell a victim to the disease during the

course of these investigations. Although THOMAS, in Brazil, recorded the production of febrile symptoms in rhesus monkeys (and guineapigs) by inoculating the blood of yellow fever patients, it seems doubtful, in view of the fatal nature of the infection in this animal, whether these symptoms were really due to the disease in question. The paper reviewed above establishes beyond all doubt the extreme susceptibility of *Macacus rhesus*, and will be of great value in future work on the aetiology of yellow fever.]

E. Hindle.

STOKES (Adrian), BAUER (Johannes H.) & HUDSON (N. Paul). **Experimental Transmission of Yellow Fever to Laboratory Animals.**—*Amer. Jl. Trop. Med.* 1928. Mar. Vol. 8. No. 2. pp. 103–164. With 28 figs. [4 refs.]

This article is mainly an extension, including full details of experiments, of the paper reviewed above. Further experiments confirm the results showing the extreme susceptibility of *Macacus rhesus* to yellow fever. *M. sinicus* is also susceptible, but to a less degree, whilst chimpanzees, all local monkeys and guineapigs were completely refractory. Filtration experiments showed that the virus in the blood will pass through Berkefeld filters V and N, but not through a Berkefeld W filter. On the other hand the virus in the mosquito, obtained by making emulsions of the infected insects, will not pass through any of these filters. Convalescent serum in doses of 0.1 cc. protected monkeys against infection, whilst anti-icteroides serum in doses of 5 and 10 cc. failed to protect monkeys in any way when infected with the disease, transmitted either by mosquito bite or by the inoculation of infected blood.

E. H.

MATHIS (C.), SELLARDS (A. W.) & LAIGRET (J.). *Sensibilité du Macacus rhesus au virus de la fièvre jaune.* [**Susceptibility of *M. rhesus* to Yellow Fever Virus.**]—*C.R. Acad. Sci.* 1928. Feb. 27. Vol. 186. No. 9. pp. 604–606. [3 refs.]

The authors describe an interesting case of the successful transmission of yellow fever to *Macacus rhesus* by means of the bites of infected *Stegomyia*, and also by the inoculation of the blood of an infected patient at Dakar, Senegal.

The patient, a Syrian 17 years old, had a mild attack of yellow fever, with slight jaundice and only traces of albumen in the urine. Sixteen mosquitoes were fed on this patient 20 hours after he first showed fever; at the same time a monkey was inoculated with 4 cc. of his blood. Two days later this animal showed a slight fever and was found dead on the 8th day after inoculation. The autopsy showed the presence of slight jaundice and lesions resembling those of yellow fever. Subinoculations into guineapigs were negative.

Twenty-four days after feeding on the patient, 11 of the mosquitoes were fed on a monkey. After 3 days incubation period this animal had a sharp rise in temperature, which continued for two days, and death occurred during the night of the fifth day. The autopsy showed the presence of slight jaundice of the subcutaneous fat and fatty degeneration of the liver. The urine contained albumen.

The same lot of infected mosquitoes were fed on a second monkey, 31 days after the infective feed. After only 60 hours this animal

showed a sharp rise in temperature and died on the fifth day. There was no appreciable jaundice, but haemoglobin was present in the stomach and the liver showed signs of fatty degeneration.

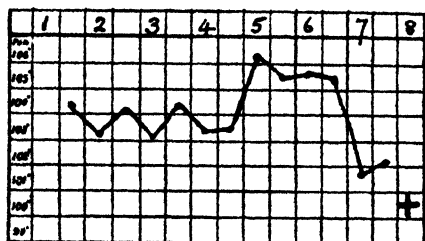
[This paper is the first independent confirmation of the important fact discovered by STOKES (see above) that yellow fever is communicable to *Macacus rhesus*, and emphasizes the necessity of getting patients at the commencement of the disease in order to be sure of obtaining the virus.]

E. H

SELLARDS (A. W.) & HINDLE (Edward). **The Preservation of Yellow Fever Virus.**—*Brit. Med. Jl.* 1928. Apr. 28. pp. 713-714. With 2 text figs. [4 refs.] [Wellcome Bureau of Scientific Research, London.]

A virus isolated from a case of yellow fever at Dakar by direct inoculation of monkeys with the blood of the patient and by the feeding of mosquitoes (see paper by MATHIS, SELLARDS & LAIGRET reviewed above) was maintained in monkeys for about 3 months. On his return to Europe one of the authors brought with him the frozen liver

Temperature chart of rhesus monkey inoculated with a suspension of frozen liver from a case of yellow fever. The animal was found dead on the morning of the eighth day.



[Reproduced from the *British Medical Journal*.]

and blood removed from a monkey at the height of the infection. The liver and blood had been frozen immediately after removal from the body and had been kept in this condition for 12 days during the journey to London. On arrival, the authors inoculated monkeys with the liver and blood. The one inoculated with the liver contracted the disease as evidenced by the characteristic temperature chart, the jaundice and the appearances at the post-mortem which was performed on the seventh day when the animal died. It is evident that the virus will withstand freezing for at least 12 days.

C. M. Wenyon.

HINDLE (Edward). **A Yellow Fever Vaccine.**—*Brit. Med. Jl.* 1928. June 9. pp. 976-977. [5 refs.] [Wellcome Bureau of Scientific Research, Endsleigh Gardens, London.]

With the virus of yellow fever referred to in the paper reviewed above (SELLARDS & HINDLE) the author has prepared what appears to be a potent vaccine. The virus has been maintained in rhesus monkeys by inoculation of liver material from animal to animal, a dose of 0.0001 grams being sufficient to produce death in four or five days. Working on the lines adopted for the preparation of vaccines in fowl plague, dog distemper and foot-and-mouth disease, vaccines

were prepared from the liver and spleen of yellow fever monkeys. Two types of vaccine were prepared, one with formalin and the other with carbolic acid. The formalin vaccine was prepared by grinding up with broken glass the liver and spleen of a monkey which had died of the disease, mixing the resulting paste with five times its weight of normal saline solution and adding sufficient formalin to make a 1 in 1,000 strength of formaldehyde. The mixture, filtered through muslin, was kept in the ice chest at 0° to -3° C. To one monkey 1 cc. of the vaccine was given subcutaneously on April 19th, 1928. Having shown nothing but a rise of temperature of 2 to 3 degrees on the fourth and fifth days it was inoculated subcutaneously on April 27th, 1928 with 0.2 gm. of infected liver. After an incubation period of 3 days there developed a mild attack of yellow fever lasting for 4 days. This was followed by a fall of temperature to the subnormal and recovery. Two control monkeys inoculated with 0.001 gm. and 0.0001 gm. of liver respectively died of typical yellow fever. The vaccinated monkey was again inoculated on May 5th, 1928, with approximately 1 gm. of liver and again showed nothing more than a slight febrile reaction.

The phenol glycerine vaccine was prepared as follows. The liver and spleen were cut into small pieces and washed well with normal saline solution. These were then ground up into a paste to which was added four times its weight of the following mixture—glycerine 600 cc., 5 per cent. phenol 100 cc., distilled water 300 cc. The mixture was filtered through muslin, kept at room temperature for a week and then placed in the ice chest. This vaccine has been tested on seven monkeys. The first was given subcutaneously 1 cc. of vaccine on April 19th, 1928, and as in the case of the monkey which had received the formalized vaccine it was inoculated subcutaneously on April 27th, 1928, with 0.2 gm. of infective liver. It showed no reaction and six days later was injected with 1 gm., and again on May 24th, 1928 with 1 gm. of infective liver. It withstood all these inoculations of virulent material and has remained in perfect health. The carbolized vaccine having given such a striking result it was decided to try it on a larger scale. On May 15th, 1928, six rhesus monkeys were given subcutaneously 1 cc. of the same vaccine which had then been kept on ice for four weeks. There was no febrile reaction, as shown by temperatures taken morning and evening. On May 24th, 1928, the six monkeys and four controls received subcutaneously approximately 1 gm. of infected liver with the exception of one of the vaccinated monkeys which had about 2 gm. All the control monkeys died in 4 to 5 days with typical symptoms. The vaccinated monkey which received the large dose of virus also died of yellow fever, but the other five remained uninfected. In view of the relatively enormous dose of virus administered it is clear that the method of protection by carbolized vaccine affords a simple means of protecting rhesus monkeys against yellow fever infection, a means which the author points out is likely to be applicable to human beings.

C. M. Wenyon.

SELWYN-CLARKE (P. S.). **Report on Yellow Fever in Accra March-June, 1927.—Gold Coast. XKVII.—1927-28.—29 pp.** With 3 folding maps & 1 folding chart. 1928. Accra. [2s.]

An interesting account of the yellow fever outbreak in Accra in March to June, 1927, including a brief history of previous epidemics.

From 1910 up to the outbreak in question there have been a total of 323 cases of the disease with 155 deaths, but probably very many unrecognized cases occurred and in 1926 at Asamankese alone, the Rockefeller Commission estimated the number at over 1,000 cases and 100 deaths.

The racial distribution of the case mortality shows 112 Europeans, with 84 deaths; 204 Africans, with 64 deaths; and 7 Syrians with 7 deaths. Cases were practically never recognized in children under 5 years of age, and the greater proportion occurred in young and middle-aged adults. With regard to the last epidemic the great majority of cases occurred in Africans, who had previously been regarded to a large extent as being immune to the disease.

The first recognized case in 1927 occurred in a Syrian. [In the recent Senegal outbreak the first cases recognized were also Syrians, and it would seem that members of this race should be carefully watched when the presence of yellow fever is suspected.]

The history of the outbreak is described in detail and there is little doubt that it was introduced from one of the infected districts a few miles from Accra. The clinical symptoms of some of the cases are dealt with and the author insists on the difficulty of recognizing the disease in the early stages. From a consideration of the African cases it is suggested that there is a certain degree of local racial immunity, but there seems to be less resistance in natives from inland areas.

The report contains a list of administrative provisions and preventive measures which are mainly concerned with anti-mosquito measures, and the isolation of patients and contacts. After the evacuation of Europeans and Syrians from the African township to the European residential area, no more cases occurred amongst them, and it would seem that contact of Europeans with the native population favours the spread of the disease. Amongst the recommendations special attention may be directed to the importance of segregating the native populations of towns which include European and Syrian inhabitants.

E. H.

YOUNG (W. A.). **Yellow Fever and Relapsing Fever. A Comparison.**—*West African Med. Jl.* Lagos. 1927. July. Vol. 1. No. 1. pp. 4-6.

A useful comparison of the two diseases giving a summary of methods of distinguishing them by post-mortem appearances, including histology, and a differential diagnostic table which is reproduced herewith:—

DIFFERENTIAL DIAGNOSTIC TABLE.

CLINICAL.

Relapsing Fever (lice-borne)	Yellow Fever.
Not so marked.	<i>Prostration.</i> Very marked.
Moist with brown coat and with occasional black-streaked dorsum.	<i>Tongue.</i> Small, pointed, bright red edges and tip, with red papillae showing through. Dorsum white coated.
If present is of a golden yellow colour.	<i>Jaundice.</i> Is present by the third day and may be as early as the first day. Distinct tinge of green in the yellow.

Urine.

Albumen slight to very moderate amount is usually present, also an occasional granular cast. No suppression.

Albumen present by 2nd or 3rd day. If earlier, prognosis very bad. Soon becomes abundant, from 1/6 to a solid tube-full when urine is boiled and acetic acid added. Yellow granular cast abundant. Blood on rare occasions. Suppression common.

Black Vomit.

As a symptom more often absent than present.

Usually present at some stage of the disease. If not seen in life is always found post-mortem.

Spirochetemata.

Easily demonstrable by dark field microscope and confirmed in stained blood film.

No organism yet demonstrated.

Lice.

Always present.

Usually absent and need not be present.

HISTOLOGICAL.

Liver.

Only individual cells or small foci necrosed here and there.
Eosinophilic liver cells absent.
Congestion marked.

Zonal necrosis usually well marked.
Eosinophilic liver cells present.
Congestion slight (occasional exceptions).
Haemorrhages numerous.
Fatty degeneration marked.
Spirochaetes absent.

Haemorrhages few or nil.
Fatty degeneration slight.
Spirochaetes numerous.

Kidney.

Cloudy and granular changes in the cells.
Casts scanty or nil.

Severe parenchymatous nephritis.
Casts numerous, including lime-casts.
Haemorrhages frequent.
Fat present.
Spirochaetes absent.

Haemorrhages usually nil.
Fat practically nil.
Spirochaetes numerous.

Heart.

Fat slight (unless in an acute toxic case, when it may be abundant).

Fat present, usually in quantity, as fine minute droplets.

E. H.

STRATHAIRN (G. C.). **A Case of Phosphorus Poisoning reported as a Possible Case of Yellow Fever. Abstract of a Communication.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1928. Mar. 31. Vol. 21. No. 6. pp. 491-493. With 1 chart in text.

The description of the clinical symptoms, and results of post-mortem examination of a case of phosphorus poisoning in Jamaica, which in many respects closely resembled yellow fever.

E. H.

HOFFMANN (W. H.). **The Anatomical Diagnosis of Yellow Fever.**—*Jl. Trop. Med. & Hyg.* 1928. Jan. 2. Vol. 31. No. 1. pp. 1-4.

The author, who has had considerable experience in Havana, emphasizes the importance of pathological histology for the diagnosis of yellow fever, since it is the only satisfactory method of identifying cases of the disease. He also remarks "I have examined a sufficient number of African cases to state that the lesions of the West African yellow fever are histologically identical with the classical lesions of the American epidemics, of which I previously had the opportunity of making a detailed study." A useful summary is given of the histological lesions observed in cases of the disease and methods of distinguishing it from other affections such as Weil's disease.

E. H.

SNIJERS (E. P.). Zur pathologischen Anatomie der Leber bei Gelbfieber und Weilscher Krankheit. [**The Pathological Anatomy of the Liver in Yellow Fever and Weil's Disease.**]—*Abhandl. a. d. Gebiet d. Auslandskunde. Hamburg. Univ.* 1927. Vol. 26. (D., Med. & Vet. Vol. 2). [Festschrift NOCHT.] pp. 539-541. [14 refs.]

The author was unable to find any difference in the pathological anatomy of guineapigs infected with *L. icterohaemorrhagiae* and those infected with two strains of *L. icteroides*, whereas the livers of yellow fever cases are distinct from those of Weil's disease.

E. H.

SELLARDS (Andrew Watson) & THEILER (Max). **Pfeiffer Reaction and Protection Tests in Leptospiral Jaundice (Weil's Disease) with *Leptospira icterohaemorrhagiae* and *Leptospira icteroides***—*Amer. Jl. Trop. Med.* 1927. Nov. Vol. 7. No. 6. pp. 369-381. [8 refs.] [Harvard Med. Sch., Boston, Mass.]

The authors made careful experiments with the serum of five patients, from four widely separated sources, and one guineapig after recovery from leptospiral jaundice (Weil's disease). All these six immune sera gave positive Pfeiffer reactions and protected guineapigs against *L. icterohaemorrhagiae* and a pathogenic strain of *L. icteroides* from Palmeiras, Brazil; moreover, titrations showed that they were essentially equal in their effects on these two strains. Consequently, *L. icteroides* must be regarded as a synonym of *L. icterohaemorrhagiae*.

In support of the rodent origin of leptospiral jaundice in man, it was found that the serum of patients protected guineapigs against a strain of *L. icterohaemorrhagiae* isolated direct from rats.

Finally, the authors state that "If the serum of a patient convalescent from an attack of acute infectious jaundice gives positive Pfeiffer reactions with protection of guineapigs against either *L. icterohaemorrhagiae* or *L. icteroides*, the diagnosis of leptospiral jaundice (Weil's disease) is justified. Negative reactions are consistent with the diagnosis of yellow fever."

E. H.

DE VOGEL (W.). La parenté, sinon l'identité, du *Leptospira icterohaemorrhagiae* et du *Leptospira icteroides* de Noguchi. [**Affinity if not Identity, of *L. icterohaemorrhagiae* and *L. icteroides*.**]—*Bull. Office Internat. d' Hyg. Publique*. 1927. Dec. Vol. 19. No. 12. pp. 1814-1826.

An interesting summary of recent observations on diseases caused by *Leptospira*, and also remarks on yellow fever. The author suggests that the reason *Aedes aegypti* only becomes infective several days after an infective meal, may be scarcity of parasites in the blood of the patient and that the causative organism of yellow fever may be more abundant in the blood before the onset of the fever.

[Dr. Beeuwkes' name is incorrectly spelt "Becuskos"].

E. H.

SCHÜFFNER (W.), MOCHTAR (Achmad), PROEHOEMAN (Sjoeib) & HONIG (L.). Weitere Beiträge zur Aetiologie des Gelbfiebers und der Bedeutung der *Leptospira icteroides* Noguchi. [**Further Investigations on the Aetiology of Yellow Fever and the Nature of *Leptospira icteroides* Noguchi.**]—*Abhandl. a. d. Gebiet d. Auslandskunde*. Hamburg. Univ. 1927. Vol. 26. (D., Med & Vet. Vol. 2.) [Festschrift NOCHT.] pp. 500-506. [6 refs.] [Trop. Hyg. Inst., Amsterdam.]

The authors compared three strains of *L. icteroides*, Le Blanc, Merida and Bahia, with a typical Weil's disease, and also with a rat strain of *Leptospira*, from Sumatra, and *L. hebdomadis*.

Agglutination and lysis reactions and also cross immunity showed that the strains of *L. icteroides* were identical with typical *L. icterohaemorrhagiae*.

Aedes aegypti were fed on guineapigs infected with *L. icteroides* (Le Blanc strain) and subsequently on normal animals after intervals of 2 to 21 days with entirely negative results. The *Leptospira*, however, was capable of living in the gut of the mosquito up to the fourth day, as proved by inoculation experiments.

As a result of their experiments the authors come to the conclusion that *L. icteroides* and *L. icterohaemorrhagiae* are identical, and that the aetiology of yellow fever is still unknown.

E. H.

BRUYNOGHE (R.) & CORNIL (J.). La parenté du *Leptospira icteroides* et du *Leptospira icterohaemorrhagiae*. [**Relationship of *L. icteroides* and *L. icterohaemorrhagiae*.**]—*C.R. Soc. Biol.* 1928. Mar. 2. Vol. 98. No. 8. pp. 598-600. [3 refs.] [Bact. Lab., Univ. Louvain.]

The authors have made a number of serological comparisons between a typical strain of *Leptospira icterohaemorrhagiae*, and the Palmeiras strain of *L. icteroides*, and a water leptospira.

"The results establish the biological identity of *Leptospira icteroides* and *L. icterohaemorrhagiae* and in view of the clinical differences between Weil's disease and yellow fever, we are compelled to believe that the specific agent of this latter infection is still unknown."

[This paper confirms the now generally accepted view that *Leptospira icteroides* is identical with *L. icterohaemorrhagiae*, and bears no relation to the cause of yellow fever.]

E. H.

MARTINI (Erich). **A Comparison of the Spirochete of Yellow Fever (*Leptospira icteroides* Noguchi) with the *Leptospira* of Weil's Disease.**—*Jl. Experim. Med.* 1928. Feb. 1. Vol. 47. No. 2. pp. 255-260. [Hygienic Lab. of Samper and Martinez, Bogota, Colombia, S. America.]

—. Ueber die Geißelfieberleptospira (*Leptospira icteroides* Noguchi) im Vergleich zur *Leptospira* der weilschen Krankheit (synonym *Spirochaeta icterogenes* Uhlenhuth und Fromme, *Spirochaeta nodosa* Huebner und Reiter, *Spirochaeta icterohaemorrhagiae* Inada, Ido, Hoki, Kaneko und Ito, Weilsche Spirochäte Ungermann und Zuelzer.—*Cent. f. Bakt.* I. Abt. Orig. 1928. Feb. 15. Vol. 105. No. 6-8. pp. 402-407 [Samper & Martinez Hyg. Labs., Bogota, Colombia.]

The main interest of this paper lies in the observations on the extraordinary duration of life and relatively meagre food requirements of *Leptospira icteroides*. Cultures made in a mixture of one part inactivated rabbit serum and three parts saline, survived more than 3½ years, whilst cultures of a strain of *L. icterohaemorrhagiae* only lived for about six months under the same conditions.

If the blood containing leptospirae was merely mixed with physiological salt solution, the latter strain lived for more than 11 months whilst *L. icteroides* died out after 6½ months.

[No definite conclusions as to the relation of these two strains can be drawn from these experiments, and the author's suggestion that the yellow fever organism might survive saprophytically in water because of the behaviour of *L. icteroides*, are negated by the doubtful nature of this organism.]

E. H.

MATHIS (C.), CAZANOVE (F.) & BACQUÉ (M.). Inoculation de sang et d'urine de jaunes à des cobayes. [Inoculation to Guinea-pigs of Blood and Urine from Yellow Fever Cases.]—*Bull. Soc. Path. Exot.* 1927. Dec. 14. Vol. 20. No. 10. pp. 1025-1038. With 8 charts. [Pasteur Inst., Dakar, Senegal.]

The blood of seven yellow fever patients at Dakar, collected respectively on the second, third, fourth and sixth days of the disease, was inoculated into 19 guinea-pigs, and in addition two guinea-pigs were inoculated with urine from a case, with entirely negative results. Moreover, the authors never observed *Leptospira* in the blood of the patients or in any of the guinea-pigs.

E. H.

SAWYER (W. A.) & BAUER (J. H.). **Survival of *Leptospira icteroides* in Various Environments.**—*Amer. Jl. Trop. Med.* 1928. Jan. Vol. 8. No. 1. pp. 17-28. [1 ref.]

Cultures of various strains of *L. icteroides* and *L. icterohaemorrhagiae* and a water *Leptospira*, were mixed with stagnant water and kept in the dark at room temperature. After various intervals the water was filtered through Berkefeld cylinders V and N and the filtrate cultured for leptospirae. The first two survived 55 days and the water leptospira at least 115 days in stagnant water.

L. icteroides was recovered in pure culture from faeces freshly inoculated with this organism, but died out in the faeces within a few hours. Large numbers of leptospirae were observed in the urine of two out of twelve guineapigs that died from infection with *L. icteroides*, but the organism could not be recovered from urine mixed with cultures, probably owing to the presence of the urine preventing growth.

Mosquitoes (*Aedes aegypti*) were fed on heavily infected guineapigs and pure cultures of *L. icteroides* obtained from these insects nine hours after feeding, but not later.

E. H.

PITTALUGA (Gustavo). El problema de la fiebre amarilla. [**The Yellow Fever Problem.**].—*Siglo Méd.* 1928. Mar. 3. Year 75. Vol. 81. No. 3873. pp. 211-229. With 2 maps in text. [3 refs.]

The author gives a good general account of the unsolved problem of yellow fever and of the doubts to which recent research has given rise. He compares yellow fever with infective jaundice due to *L. icterohaemorrhagiae* and with dengue, and, recognizing that *L. icteroides* can no longer be regarded as the cause of yellow fever, he concludes, as is inevitable, that vaccines prepared from this (hypothetical) organism cannot confer prophylactic immunity.

A brief record is presented of the prevalence of yellow fever on the West coast of Africa in the five years 1921-5, during which 106 Europeans were attacked, 46 of them on the Gold Coast and 25 in Lagos. In Senegal there was an outbreak, beginning in October 1926, the disease being brought by a caravan of Syrians. In the ensuing three months 16 Syrians and 18 Europeans fell victims and of these 29 died.

H. Harold Scott.

AUDIBERT. La fièvre jaune en Afrique Occidentale Française en 1926-1927. [**Yellow Fever in French West Africa, 1926-27.**].—*Bull. Office Internat. d'Hyg. Publique.* 1927. Dec. Vol. 19. No. 12. pp. 1805-1813. With 1 map. [3 refs.]

A history of cases of yellow fever occurring in the French West African colonies during 1926 and 1927. In the first year, Senegal had 53 cases with 41 deaths, but of these, 25 cases including 23 deaths were among Syrians who only constitute one-ninth of the total white population. The Syrians, however, live in close contact with the natives and do not observe the most ordinary prophylactic measures, such as using a mosquito net, and consequently are commonly the first to become infected. The author points out that the incidence of yellow fever cases in the West Coast of Africa proves the existence of an endemic centre for the disease, as it is obviously not being introduced from South America.

With reference to the 1927 epidemic in Senegal, there were 151 cases with 104 deaths in six months, but the author remarks that this is only 1.5 per cent. of the total white population. It is stated that a Commission to study the disease has been formed by the Pasteur Institute

in Paris, and is going out to Dakar under the direction of Professor PETTIT. Up to the present all attempts in Senegal to find *L. icteroides* in cases of yellow fever have been negative, and the use of the vaccine made with this organism is considered of very doubtful value.

E. H.

SCHÜFFNER (W.). Neuere Untersuchungen ueber die Aetiologie des Gelbfiebers. Die Identität der *Leptospira icteroides* und der *Leptospira icterohaemorrhagiae* (syn. *icterogenes*). [**New Work on the Etiology of Yellow Fever.**]—*Muench. Med. Woch.* 1928. Apr. 20. Vol. 75. No. 16. pp. 682–683. [Trop. Hyg. Inst., Colonial Inst., Amsterdam.]

A useful review of the recent experiments which have proved the identity of *Leptospira icteroides* and *L. icterohaemorrhagiae* and led to the conclusion that yellow fever is not a leptospiral disease.

E. H.

HOFFMANN (W. H.). Die stille Feiung beim Gelbfieber. [**Immunity without Previous Symptoms of Illness in Yellow Fever.**]—*Muench. Med. Woch.* 1928. Apr. 13. Vol. 75. No. 15. pp. 649–650. [Finlay Lab., Health Ministry, Havana.]

An account of the view that yellow fever is maintained in endemic centres by the infants becoming infected without showing any obvious symptoms of the disease.

E. H.

RIGOLLET (S.). A propos de la prophylaxie de la fièvre jaune à la côte occidentale d'Afrique. [**Yellow Fever Prophylaxis on the West Coast of Africa.**]—*Bull. Soc. Path. Exot.* 1927. Nov. 9. Vol. 20. No. 9. pp. 858–865.

An account of prophylaxis against yellow fever in West Africa with special reference to Dakar.

E. H.

BULLETIN DE LA SOCIÉTÉ DE PATHOLOGIE EXOTIQUE. 1927. Nov. 9. Vol. 20. No. 9. pp. 833–838. [1 ref.]—Prophylaxie de la fièvre jaune. [**Yellow Fever Prophylaxis.**]

A useful summary of prophylactic measures against yellow fever recommended to the French Colonial Secretary by a Commission composed of Messrs. BOUFFARD, JOYEUX, LEGER, RIGOLLET, ROUBAUD and SALIMBENI, with MARCHOUX as president.

E. H.

REMLINGER. La protection du Maroc contre la fièvre jaune. [**Protection of Morocco against Yellow Fever.**]—*Bull. Acad. Méd.* 1927. Nov. 22. Year 91. 3rd Ser. Vol. 98. No. 38. pp. 435–443. [15 refs.]

A paper drawing attention to the curious fact that no cases of yellow fever have yet been recorded from Morocco, although the countries both north and south have suffered from epidemics. Moreover *Stegomyia fasciata* is extremely abundant in the country and the climatic conditions are favourable to the spread of the disease. The author discusses the reason for this freedom from infection, which is probably due to the political isolation of the country until recent times. At present the greatest chance of the disease being introduced seems to be

by boat from Senegal, although the possibility of other methods, such as by aeroplane, are also considered. Finally the author advocates the adoption of certain prophylactic measures in order to avoid the possibility of yellow fever being introduced.

E. H.

PERYASSU (Antonio Gonçalves). Prophylaxia da febre amarella no Brazil. [**Prophylaxis against Yellow Fever in Brazil.**]—*Archivos de Hyg.* Rio de Janeiro. 1927. Sept. Vol. 1. No. 2. pp. 49–86. With 11 plates (2 maps). With English summary.

The first part is an account of the history of yellow fever from its introduction into Brazil, from the West Indies in 1685, down to the present time. The author then gives details of an outbreak of this disease during 1926 in Pirapora, a town of 5,000 inhabitants in the state of Minas Geraes. During the epidemic there were 45 cases of yellow fever of which 18 died. Although this town is small there is considerable traffic through it, both by river and railway, and it is rather remarkable that up to this outbreak no cases of the disease had been found. The 1926 epidemic was attributed to the presence of large numbers of troops, some of whom came from the states of Pernambuco and Parahyba, where the disease is said to be not yet exterminated, and spread the infection along the valley of the river San Francisco.

The author states that in the interior of Bahia, Minas, and North-eastern Brazil, there are several regions presenting groups of small villages or towns totalling fifty to two hundred thousand inhabitants, where the disease is endemic and affects the young children in a mild form.

The only method of eradicating yellow fever is to destroy every breeding place for mosquitoes, and even when the larval index falls to 2 per cent. anti-larval measures should be carried on for another two years.

E. H.

BOUDREAU. Pourquoi laisse-t-on évoluer la fièvre jaune ? [**Prevention of Yellow Fever.**]—*Jl. Méd. de Bordeaux.* 1927. Dec. 10. Vol. 104. No. 23. pp. 913–917.

An article advocating the use of iodine as a universal prophylactic against all parasitic diseases, including yellow fever, and also for treatment. No experimental details are given.

E. H.

SELLARDS (A. W.). La lutte contre la fièvre jaune. [**The Fight against Yellow Fever.**]—*Bull. Soc. Path. Exot.* 1928. Jan. 11. Vol. 21. No. 1. pp. 70–73. [4 refs.]

A useful account of the evidence supporting the author's conclusions that *Leptospira icteroides* and *L. icterohaemorrhagiae* are identical; that *L. icteroides* is not transmitted by the mosquito; and that it has no causal relation whatever with yellow fever.

In view of the conditions in West Africa the author insists on the urgent necessity of discovering some method of preventive vaccination in addition to carrying on anti-mosquito campaigns.

E. H.

HOFFMANN (W. H.). Die Schutzimpfung gegen das Gelbfieber in Westafrika. [**Protective Inoculation against Yellow Fever in West Africa.**]—*Klin. Woch.* 1927. Nov. 12. Vol. 6. No. 46. pp. 2191-2192. [Finlay Lab., Philippine Health Service, Habana.]

An article recommending the use of Noguchi's vaccine (*L. icteroides*) for protection against yellow fever in West Africa; also advocating the desirability of keeping supplies of the immune serum.

E. H.

RENAULT (Jules). A propos du vaccin de Noguchi contre la fièvre jaune. [**Noguchi's Vaccine and Yellow Fever.**]—*Bull. Acad. Méd.* 1927. Nov. 22. Year 91. 3rd Ser. Vol. 98. No. 38. p. 434.

An official letter from the French Colonial Secretary to the Academy of Medicine asking their opinion of the value of Noguchi's vaccine. The reply indicates that although its value is disputed, the use of the vaccine does no harm, so could be given if requested, but that anti-mosquito campaigns remain the only certain method of combating the disease.

E. H.

HOFFMANN (W. H.). Ueber das vorkommen der Gelbfiebertmuecke in Niederlaendisch Indien. [**The Possibility of Yellow Fever in the Dutch East Indies.**]—*Meded. Dienst d. Volksgezondheid in Nederl. Indië.* 1928. Vol. 17. Pt. 1. pp. 182-183. [Finlay Lab. Dept. of Health, Havana.]

BRUG (S. L.). Remarks to the Previous Paper of Prof. Dr. W. H. Hoffmann.—*Ibid.* pp. 184-185. [Med. Lab. Weltevreden, Java.]

The first paper contains records of crossing two strains of *Aedes aegypti*, one from Cuba and the other from the Dutch East Indies. No differences whatever were observed in the fertility of the offspring of these crosses, carried through four generations, and moreover the two were morphologically identical.

Consequently there is no support for the view [*ante*, p. 274] that Asia has remained free from yellow fever because it has a different race of *Aedes aegypti* from that in America.

The second paper is a record of similar experiments carried out in Java, entirely confirming the results obtained in Cuba.

E. H.

DA FONSECA, Filho (Olympio). Estado actual da questao da etiologia da febre amarella.—*Folha Med.* 1928. Jan. 15. Vol. 9. No. 2. pp. 17-18.

HOFFMANN (W. H.). La fiebre amarilla africana.—*Sciencia Med.* 1927. Dec. Vol. 5. No. 12. pp. 671-673. [Finlay Lab. Havana.]

HOFFMANN (W. H.). La fiebre amarilla africana.—*Rev. Méd. de Hamburgo.* 1928. Jan. No. 1. 3 pp.

MATTOS (Emygdio). Prophylaxia da febre amarella. Conferencia realizada no Curso de Hygiene e Saude Publica, cadeira de Epidemiologia e Prophylaxia Geraes, em Outubro de 1926.—*Archivos de Hyg.* Rio de Janeiro. 1927. May. Vol. 1. No. 1. pp. 95-119. With 1 plate. [2 refs.]

MALARIA.

- i. SEAGAR. **Malaria in Barbados.**—*Trop. Agriculture*. Trinidad. 1928. Mar. Vol. 5. No. 3. pp. 48–50. With 1 plate.
- ii. BALFOUR (Andrew). **The Infection of Barbados with Malaria.** [Correspondence.]—*Brit. Med. J.* 1928. Jan. 21. p. 114.
- iii. HANSCHHELL (H. M.). **The Infection of Barbados with Malaria.** [Correspondence.]—*Ibid.* Jan. 28. p. 157.

i. On October 8th, 1927, seven cases were notified in Barbados as typhoid fever, the epidemic being fulminant and reaching 300 in 5 weeks. In November, Seagar visited the Island and found *P. falciparum* in the blood films he took from these patients. The initial cases were without rigors, but with vomiting and sometimes early jaundice. Deaths were mainly in the elderly and weak; attacks were milder in children; splenomegaly was absent. *Anopheles albimanus* was found widespread in grassy pools; it had never been found before. The plasmodium was probably imported in returning Cuban labourers and the anopheles in the holds of small schooners trading with the Antilles or Demerara. Extermination is favoured by the porous coral formation which leaves little surface water in the dry season; it is apparently being hindered by dispute as to whether antimosquito measures should be anti-larval or anti-adult. As Seagar says "In the case of an epidemic of malaria such as that in Barbados, success can only be achieved by a vigorous attack from all angles." Seagar, if one reads rightly, does not seem hopeful that local action will prove sufficiently varied or sufficiently vigorous.

ii. Dr. Andrew Balfour notes that after a visit to Barbados in 1914 he pointed out the risk of seafaring anopheline immigrants and suggested the construction of traps, in the form of ideally constructed breeding places close to the wharves. He was told that "it would immediately result in a campaign of calumny, and that any hapless medical man who tried it would run the risk of being accused of enticing deadly insects to the island." He added then "Barbados is justly proud of a fine conservatism, but it may be, and is, carried too far in sanitary matters."

iii. In a postscript Dr. Balfour mentions certain observations by Dr. Hanschell, who writes that, in 1927, he learnt from a master of a small intercolonial schooner how difficult it was to detect mosquitoes in the dark fore-peak unless the process was set about in the proper way. This consisted, most simply, in flapping a cloth round, when the insects, which were not stegomyia, were roused.

Clayton Lane.

RAYNAL (J.). Enquête sanitaire à la Grande Comore en 1925. Observation de paludisme à forme épidémique. [**Epidemic Malaria in Grand Comoro, 1925.**]—*Bull. Soc. Path. Exot.* 1928. Jan. 11. & Feb. 8. Vol. 21. Nos. 1 & 2. pp. 35–54; 132–141. With 3 maps & 1 chart in text. [1 ref.]

This publication tells the sufficiently dramatic story of the introduction of malaria into the Grand Comoro Island, the largest of the group of small islands which lie between the north end of Madagascar and the mainland. It contains the active volcano Karthala. At its northern point at Bangoi-Kouni there began in October, 1925, a vague epidemic,

not accompanied by typical attacks, but which the local medical man, RAMASY, one of the three the island possesses, concluded from its reaction to quinine to be malaria. He was not believed, for there never had been malaria in Comoro, and so the town lost by death a third of its thousand inhabitants and now has a spleen rate of 41. The spread of malaria throughout the island during 1924 and 1925 is mapped out, and now Moroni, the chief town on the west coast, shares with Bangoi-Kouni the fame of a spleen rate of 41 which in other places varies, down to 3 in Kombani, east of the central mountain range. All species of parasites are concerned, 104 positive slides showing *P. falciparum* in 58, *P. vivax* in 34, and *P. malariae* in 12. Quinine has not been readily accepted. As a rule increased prosperity brings lessened malaria; in this case increased prosperity, the result of vanilla and coconut production, has meant the opposite. In this island into whose light volcanic soil water disappears and which seems to possess almost no surface water, increased prosperity has meant that almost everyone has built his own unprotected water cistern. This would have been well in 1908, when there were no mosquitoes on the island, but now these cisterns may be found swarming with larvae. Moreover, 1925 was an exceptionally rainy year, and the Mohammedan fast of Ramzan, with its weakening effect, fell in April-May and coincided with the flaring up of malaria. Breeding occurs here also in the axils of the coconut palm. Preventive measures recommended follow usual lines, except that coconut oil is the cheapest oil available. It is held that a European doctor conducting an anti-malarial campaign will enable Grand Comoro again to merit from its inhabitants the appellation of "the pearl of the Indian Ocean." This clearly must rest solely with the inhabitants.

C. L.

ARLO. Une mission antipaludique à la Réunion. [**An Antimalarial Mission in Reunion.**]—*Ann. de Méd. et de Pharm. Colon.* 1927. Oct.-Nov.-Dec. Vol. 25. No. 4. pp. 413-447.

——. Rapport sur une mission antipaludique à la Réunion.—*Rev. d'Hyg. et de Méd. Préventive.* 1927. Nov. & Dec. Vol. 49. Nos. 11 & 12. pp. 820-857; 925-940.

A detailed report of local incidence of malaria. The spleen and parasite indices were 0 to 75 and 53.35 respectively. Suggestions for prevention follow the usual lines. The species of anopheles concerned does not seem to have been determined. The infection is mostly with *P. vivax*, *P. malariae* is frequent, *P. falciparum* rare.

C. L.

MANSFIELD-ADERS (W.). **Notes on Malaria and Filariasis in the Zanzibar Protectorate.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1927. Nov. 25. Vol. 21. No. 3. pp. 207-214. With 1 map.

Malaria.—Six anopheles have been identified in Zanzibar, *A. costalis*, *A. funestus*, *A. mauritanus*, *A. maculipalpis*, *A. squamosus*, *A. longipalpis*. The last four have never been found engorged in houses, and only the first two have been dissected. *A. costalis* showed a sporozoite rate of 7.7 per cent. in 1,833 examined seven days after capture, having been fed on date and water in the meantime, with a low mortality. In the same circumstances the sporozoite rate of 1,167 *A. funestus* was 7.

The central prison showed the lowest rate, 3.8. Both mosquitoes breed widely, *A. costalis* wherever there is sun even in shallow depressions in coral rocks just above high-water mark, *A. funestus* wherever there is shade. The parasite rate for African children is 67.8 and the gametocyte rate 13.6, the corresponding rates for *P. vivax* being 38.7 and 8.4, for *P. falciparum* 19.6 and 3.3, and for *P. malariae* 5.7 and 2.2. The adult rate is about 20 per cent.

C. L.

SERGEANT (Edm. & Et.), CATANEI (A.) & SENEVET (G.). Monographies des localités dénoncées comme palustres en Algérie. Troisième série. Etudes épidémiologiques et prophylactiques du paludisme en 1925-1926. [**Epidemiological and Prophylactic Studies of Malaria in Algeria. 1925-26.**]-Arch. Inst. Pasteur d'Algérie. 1927. June. Vol. 5. No. 2. pp. 131-160. With 25 text figs. (4 maps).

This note continues the published record of local incidence of malaria in Algeria with suggestions for prophylaxis. It is illustrated by an outline map and, in most localities, by a diagram of splenic and parasitic indices and by a sketch of the place under report. The local value of this survey will prove very great. It should be a valuable pattern to others.

C. L.

BENGAL. Public Health Department. **Report of the Malaria Survey of the Jalpaiguri Duars.** [STEWART (A. D.).]-pp. xi + 67. With 1 plan. 1926. Calcutta. Govt. Press. For official use only.

Malaria and mosquito surveys were carried out on tea gardens in the Himalayan foothills east of the Tista river in the years 1924-25 by SUR and IYENGAR and inspected by Stewart. The report, published in 1926, has just been received. It is an attempt to apply to the Duars the Malayan system of subsoil drainage. The Meenglas Tea Estate was the spot selected, having a spleen and parasite index of 90 in August 1908, and a spleen rate of 68 in March, 1914. Over an area of about half a square mile of undulating country with streams in the valleys, having a gradient of 1 in 100 to 1 in 60, the streams were taken underground in four-sided sub-drains formed by stone blocks at bottom, sides and top. Larvae were never found in these unless they were exposed by a cow, a washerman or a fisher of sprats. Further down the water entered concrete troughs. The covered drains removed all normal surface water but this ran above them for a day or two after heavy rain. Other exposed water was oiled. It was found that flushings of streams did not carry off larvae, which attached themselves to the edges and hung on till the risk of being swept off had passed. Malaria was in fact reduced, as judged by the spleen index, but rather disappointingly so, a fact attributed to the smallness of the area treated. Labour is free and not too plentiful and managers mostly anxious to improve conditions; opposition to this comes essentially from the coolies themselves. A few hours' work a day gives them enough to live on, an occasional extra hour a weekly drink, and a month's hard work enough for a wedding feast; and this is all the work that many will do, while ruining good houses by filth and cattle wallows. Still industry and thrift are rapidly increasing, the most hopeful aspect of the problem.

The most dangerous anopheles found are *A. maculatus*, *A. listoni*, *A. culicifacies*. Malaria can be suppressed in the Duars not by the action of isolated enthusiastic managers, but by concerted action of these over a number of adjacent gardens.

C. L.

CRAWFORD (V. J.). **Notes on Malaria in Maymyo.**—*Jl. Roy. Army Med. Corps.* 1928. Feb. Vol. 50. No. 2. pp. 109–116.

Maymyo, Burmah, lies at 3,500 feet with an annual rainfall of about 60 inches and a mean summer temperature of 70°–74° F. The garrison comprises two Burmese and one British battalion. Anopheles are few, found only 3 times in 3 years, yet the malaria rate in troops has been as high as 25 per cent. per annum. The stricter use of antilarval measures round barracks and a two-months course of quinine, 10 grains daily except on Sundays, to all Chin and Kachin recruits, and to all sepoys returning from leave, have brought down the admission ratio per 1,000 to 69·11 for British troops and from 202·75 to 101·17 for Indian ones.

C. L.

SENIOR-WHITE (R.). **Studies in Malaria, as it affects Indian Railways.**—*Indian Med. Gaz.* 1928. Feb. Vol. 63. No. 2. pp. 55–72. With 5 charts (1 folding) & 11 figs. on 3 plates. [7 refs.]

"A death a sleeper" describes the construction of railway lines in certain hyperendemic areas of India. This paper gives information regarding such construction in north-eastern Madras. In 1897 a survey of this part broke down from illness of the staff, in 1907 the process was repeated, in 1923 a survey of a portion with duplicated staff left 25 per cent. effective on completion. The paper describes the writer's arrival at a section of the surveyed line which was supposed to be still outside the hyperendemic area and on which work had just started on squashy ground where every foot print filled with water and bred *A. culicifacies*, the improvised herringbone drainage, the oiling, the scarce labour collected into camps and not strung along the line, village spleen rates of 62 to 67, obstructive contractors, the final collection of statistics of fever incidence from the coolies themselves, and, as a result, a malarial incidence which never reached 2 per cent. of the total strength. It is not difficult to see between the lines the immense amount of personal work put in by the writer. Full local details and beautiful photographs are found in this valuable paper.

C. L.

MORIN (Henry G. S.). *Recherches sur l'index paludéen de la population indigène dans la région du Kontum (Centre Annam).* [**The Malarial Index of the Natives in the Kontum District of Annam.**]—*Bull. Soc. Path. Exot.* 1928. Jan. 11. Vol. 21. No. 1. pp. 26–34. [Pasteur Inst., Saigon.]

This large fertile plateau two to three thousand feet high, and about 14° N. latitude, has recently been partly opened up, and Annamite labour imported. These coolies strike all newcomers by their miserable appearance—tired, unhappy, cachectic—in marked contrast to the Moïs warriors and hunters. An inquiry into the cause of this condition

was instituted through the Pasteur Institute, Saigon. Apart from local details, the most important point is perhaps that splenomegaly in the imported Annamites ran as high as 99 per cent, in one village, whereas in the Moïs tribes from the same village it amounted to 12·6. Blood infection was high, the parasite being most frequently *P. malariae* in the indigenous Moïs and *P. falciparum* in the imported Annamites. No evidence was found that leishmania is significantly responsible for the splenomegaly. [The question whether ankylostomiasis is concerned in the wretched condition of the Annamite is not raised.]

C. L.

BOREL (M.) & LE-VAN-AN. Le paludisme à Saigon. [**Malaria at Saigon.**]*—Bull. Soc. Path. Exot.* 1927. Dec. 14. Vol. 20. No. 10. pp. 994–1004. With 3 text figs.

This work is mainly of local interest. Most of the infection concerned is with *P. vivax*. The general percentage of infection is put at less than 11, at 4·5 in children attending dispensaries, and at 0·39 in school children. It mainly occurs in hutted quarters of the town, which are gradually disappearing, houses of stone or brick replacing huts. *A. fuliginosus* and *A. kochi* are but sparsely represented. Many coolies from Tonkin and Annam have appeared locally, and introduced a nebulous epidemic.

C. L.

DOROLLE (P.). Le paludisme à Hagiang (Tonkin). [**Malaria at Hagiang.**]*—Bull. Soc. Path. Exot.* 1927. Nov. 9. Vol. 20. No. 9. pp. 895–921. [5 refs.]

Among many observations of great local value are some of general interest. Hagiang, near the Yunnan frontier, altitude 500 to 660 feet, is one of the most malarious posts in Tonkin. The spleen rate, even in Europeans, is 80 per cent. and the death rate from malaria about 4 per cent. per annum. Of 643 blood smears examined in persons suspected of malaria 65 per cent. were positive, and of the positives the percentages of infections were: *P. falciparum* 62, *P. malariae* 15, *P. vivax* 13, *P. falciparum* and *P. malariae* 7, *P. vivax* and *P. falciparum* 3. Of 350 mosquitoes examined, only 10 were anopheles and Dorolle has never seen an anopheles larva there. His predecessor had equally remarked on the rarity of anopheles. In discussion LÉGER said that in 1910 he and C. MATHIS were told regarding Tuyen-Quang, in Tonkin, that anopheles were practically absent. They took a laboratory boy there who was very skilful in catching mosquitoes and he captured 840 anophelines in three evenings.

C. L.

WALCH (E.) & SOESILO (R.). **Malaria in Tegal.***—Geneesk. Tijdschr. v. Nederl.-Indië.* 1927. Vol. 67. No. 6. pp. 777–823. With 4 plates & 9 figs. (2 maps). [5 refs.]

This is one of the detailed reports which are put out from the Dutch East Indies—in this case concerning itself with an epidemic of malaria breaking out in 1926 in a town of 28,000 inhabitants on the north coast of Java. In one district the parasite rate in children reached 67 with a spleen rate of 81. In another the two rates were 47·5 and 100, the spleen rate for all inhabitants examined being 94·5. In another district

of 2,998, there was a parasite rate of 38.6 and a death rate during 16 weeks of 115.1 per thousand. Tertian malaria comprised nearly three-quarters of the cases and quartan less than 5 per cent. The percentage of crescent carriers was as high as 85 in places. Of 245 *A. ludlowi* 2 per cent. were infected and of 447 *A. rossii* one or 0.2 per cent.

C. L.

MARCHOUX (Emile). Anophelismo e paludismo. [**Anophelism and Malaria.**—*Rev. Med.-Cirurg. do Brasil.* 1927. Oct. Vol. 35. No. 10. pp. 399-403]

Read in Portuguese before the Academy of Medicine, Rio de Janeiro, this paper deals in the main with work already reported for Corsica (this *Bulletin*, Vol. 23, p. 136) and for the Rhone valley (*loc. cit.*, Vol. 24, p. 256). The writer summarizes his conclusions much as follows. There is no relationship between the number of anopheles found and the intensity of malaria present; indeed he goes so far as to state that the more anopheles the less malaria, so that the essential point is to discover not how to destroy mosquitoes, but how to protect man. This defence must be based on economic features of which the most important is the standard of living of the population in country districts; for the anopheles is not, as is the vector of yellow fever, a town dweller.

C. L.

SWELLENGREBEL (N. H.). Eine Vergleichung der Änderungen, welche die jährlichen Zahlen der Malariakranken und Anophelen in den letzten Jahren in der Umgebung Amsterdams aufwiesen. [**A Comparison of Fluctuations in the Annual Figures of Malaria and Anopheles about Amsterdam.**—*Abhandl. a. d. Gebiet d. Auslandskunde. Hamburg. Univ.* 1927. Vol. 26. (D., Med. & Vet. Vol. 2.) [Festschrift NOCHT.] pp. 542-546. [Trop. Hyg. Inst., Amsterdam.]

Writing from the Tropical Hygiene Institute, Amsterdam, Swellengrebel recalls the fluctuating annual incidence of "intermittent fever" in Amsterdam from 1849 to 1875. Starting about 2,500, it reached 5,600 in 1852 and nearly 24,000 in 1857, falling to about 2,000 in 1861, rising to 5,000 in 1883, reaching 1,600 in 1867 and 1,700 in 1875. Malaria in Amsterdam was 1,669 in 1921, 2,392 in 1922, but still 403 in 1926, the population having in the meantime more than trebled as compared with earlier days. The "intermittent fever" curve has two annual apices, one in March to May and another in September or October, with quartan fever reaching 21 per cent. The recent outbreak had its maximum in May or June, with quartan infection almost completely absent. An interesting table shows the malarial infections in Wormerveer from 1902 to 1926 occurring in the medical practice, covering about 3,000 persons, held first by KORTEWEG and then by LAMPE. The turning points of the curve are 1902, 540; 1904, 56; 1906, 126; 1910, 3; 1912, 40; 1914, 10; 1922, 326; 1924, 12; 1926, 18. The recent epidemic round Amsterdam is not associated with excessive abundance of anopheles but there is a rough [quite rough] connexion between this and the number of anopheles caught in houses.

C. L.

MATARANGAS (G.). La Grèce pays d'élection du paludisme. [**Greece and Malaria.**]—*Bull. Office Internat. d'Hyg. Publique.* 1927. Oct. Vol. 19. No. 10. pp. 1457-1459.

A historical note presented to the Committee of the Office International d'Hygiène Publique.

In 1905 a Committee was formed which spread broadcast knowledge of the cause, prevention and treatment of malaria and worked on improving the health of Athens and Marathon. In 1907-8 the State instituted the sale of large quantities of quinine at cost price, and the incidence of malaria fell in 3 years from 29.09 to 9.83 per cent.; three million drachmae were assigned yearly for drainage. In 1915 another half million was added, and special sums allotted for the drying up of 56 marshes. In 1922 local authorities were pointedly reminded of their duties, and a Ministry of Health was formed. Quinine proved quite insufficient for the rise in infection, caused by the influx of a million and a half infected refugees into a country of 1,731,288 inhabitants with an infection rate of 21.56 per cent. In 1925 an arrangement was made between the State and La Compagnie Anglo-Américaine Faountessi for the draining of the Salonika plain and the Artzan and Amatovou lakes, and for work to prevent flooding. Since then active propaganda has been carried on; and medical men have received instruction. Malarial morbidity has decreased from 32.03 to 16 per cent. and mortality from 3.32 to 1.16.

C. L.

LIPPINCOTT (Leon S.). **Observations on Malaria.**—*New Orleans Med. & Surg. Jl.* 1928. Jan. Vol. 80. No. 7. pp. 413-415. [4 refs.]

The cases officially returned as malaria to the State Board of Health, Mississippi, numbered during seven years 776,558. In Warren County during seven years 13,803 cases were reported as malaria. In 13,034 examinations made there during these 7 years Lippincott found parasites 117 times or in 1.36 per cent.; 12.99 per cent. of the positives were from negroes. Tertian malaria appears mainly from May to August and comprises the majority of cases, and subtertian from September to November. The normal local percentage of large monocytes being put at 6.5, the figures of tertian infections were 8.5 and of subtertian 10.1. There was no leucopenia. The discrepancy between the clinical reports and laboratory findings, it is pointed out, does great harm. The former are broadcast and deter prospective settlers and visitors at a time when great efforts are being made to bring these to the State, and the paper read before the State Medical Association points out to medical men the harm these incorrect diagnoses are inflicting on the community.

C. L.

ROUBAUD (E.). Sur l'inaptitude du *Plasmodium praecox* à l'évolution hivernale chez l'*Anopheles maculipennis*, et ses conséquences épidémiologiques pour l'Europe septentrionale. [**Non-development of *P. falciparum* in *A. maculipennis* in Winter: its Epidemiological Results for N. Europe.**]—*C.R. Acad. Sci.* 1928. Jan. 30. Vol. 186. No. 5. pp. 329-331. [7 refs.]

JANCZO has shown that *P. vivax* develops to sporozoites at 15° to 17° C. in *A. maculipennis* in about 53 days. SWELLENGREBEL has shown that

about Amsterdam two consecutive developmental cycles occur during the winter, the mosquitoes remaining in houses. Regarding *P. falciparum*, it is noted that WENYON in Macedonia found no development during hibernation at temperatures between 9.6° and 18.2° C., Roubaud's experience coinciding. He quotes three series of experiments with *P. falciparum* in which development occurred freely in the mosquito at temperatures of 20° to 25° C. but not at lower ones. He accepts this as conclusive and puts forward the following as a hypothesis for the distribution of malaria in Europe. Anopheles are deviated by cattle in the warm months, the winter being the dangerous time of infection for man. At this season *P. vivax* is carried by anopheles hibernating in houses while *P. falciparum* is not. [In comment it may be noted that the value of the hypothesis depends entirely on the degree to which *Anopheles maculipennis* is a total abstainer from human blood. If she is not absolutely so, and the English autochthonous war infections show that she is not, the hypothesis seems an imperfect explanation.]

C. L.

RUGE (Reinhold). Warum bei Malaria keine volle Immunität entsteht? [**Why is there No Complete Immunity in Malaria?**]
Med. Welt. 1927. Oct. 29. Vol. 1. No. 39. 2 pp.

Ruge points out that malaria pigment is found always in the endothelial cells of the capillaries, venules, and sinuses, in the macrophages of spleen and lymph glands, and in the large mononuclear leucocytes, and concludes that there is failure to produce immunity to malaria because the reticuloendothelial system is blocked by the granular pigment just as it may be blocked by Indian ink, trypanosan or collargol; and just as splenectomy produces relapsing fever infection or trypanosomiasis in mice, or the inundation of the blood by *P. kochi* in monkeys and by malaria parasites in man.

C. L.

WILLCOCKS (William). **Why is Cultivated Egypt Immune from Malaria?**—13 pp. With 2 Appendices & Note on Discussion. 1927. Dec. Cairo: Printed at the Nile Mission Press.

Sir William Willcocks is satisfied that the relative [it is not absolute as his paper suggests] immunity of Egypt from malaria is due to clover, and all else is fitted into the picture. "There must be something in all leguminous plants, especially in certain kinds of clover, which makes mosquitoes immune from malaria." He quotes D'HERELLE that in all malaria-free regions of Argentina there is a scented clover, *Melilotus altissima*, whose blossoms are frequented by the malaria mosquitoes which feed on the syrup coumarin and he asks—May not this act on the mosquito as does quinine on man? *Melilotus* introduction has coincided with expulsion of malaria from certain islands of Zealand and from the northern provinces of Holland. In comment it may be asked—Has the freedom from malaria of cultivated Algeria anything to do with clover? or for that matter is cultivated England's freedom so caused?

C. L.

BUICE (W. A.). **Biological Difficulties in Eradicating Malaria.**—*Southern Med. Jl.* 1927. Dec. Vol. 20. No. 12. pp. 931-933. [10 refs.] [School of Med. Univ. Oklahoma, Norman, Okla.]

"There are five biological difficulties in eradication of malaria which were not encountered in the extermination of yellow fever: (1) possible persistence of the infecting agent in the body of the recovered malarial patient; (2) persistence of the infecting agent of malaria in the body of the mosquito host over the winter season; (3) the wide-spread distribution of malaria, which does not exist in a few endemic localities only; (4) the mosquito host of the malarial parasite breeds in natural bodies of water and the larvae are thus difficult to reach and destroy; (5) the travelling habits of anophelines, which often carry them as far as two and one-half miles from their breeding places. These five obstacles present factors which probably for a number of years will prevent the total eradication of malaria in the Western Hemisphere, as has been accomplished for yellow fever."

C. L.

MAXCY (K. F.), BARBER (M. A.) & KOMP (W. H. W.). **On the Significance of Spleens Palpable on Deep Inspiration in the Measurement of Malaria.**—*Public Health Rep.* 1927. Dec. 9. Vol. 42. No. 49. pp. 3010-3021. [19 refs.]

It is recalled that DARLING rendered spleen palpation more delicate than it is as commonly used in the field by making the children lie down and breathe deeply. The spleens made palpable by this means were carefully investigated by those writing this paper and checked by thick films. It is concluded that the procedure makes palpable in children a large number of normal spleens, while figures so obtained cease to be comparable with those collected in other countries. It is the spleens which reach or extend below the costal margin which are significant in the measurement of malaria.

C. L.

CANCIULESCO (M.), HERMAN (Leon) & HIRSCH (R.). Adréralino-diagnostic du paludisme latent. [**Adrenalin Diagnosis of Latent Malaria.**]—*C. R. Soc. Biol.* 1928. Feb. 17. Vol. 98. No. 6. pp. 459-460. With 1 text fig.

By mouth adrenalin has proved ineffective as a provocative of the entrance of malaria parasites into the circulation; it is neutralized by the gastric juice. Subcutaneously it has been given in 12 cases in doses of 0.5 to 1 mgm. and, these failing, of from 1.5 to 2 mgm. Seven cases have shown plasmodia in 15 to 60 minutes. The five who failed had previously received a very thorough course of quinine and arsenic. On one occasion injection of 2 mgm. gave rise to symptoms which had to be combated by amyl nitrate. It is concluded, as so often without evidence offered, that appearance of parasites in the circulation makes them more susceptible to quinine.

C. L.

PULIDO (A.). Hypothèse d'une immunisation indirecte probable contre le paludisme. [**Does Indirect Immunization against Malaria exist?**]—*Bull. Office Internat. d'Hyg. Publique.* 1927. Oct. Vol. 19. No. 10. pp. 1455-1456.

This communication, made to the Office International d'Hygiène Publique in April-May 1927, is concerned with work by Dr. FERRAN at

the Royal Academy of Medicine of Spain. Starting from the observation that anopheles prefer some human beings and altogether neglect others Dr. FERRAN put to himself the question whether antibodies were formed which produced negative tropism of mosquitoes towards certain individuals. He first proved that injections of bodies of crushed mosquitoes, up to a quantity of 5 injections each representing 5 mosquitoes, were harmless. The mosquito bite ordinarily produces a red spot 2 mm. in diameter surrounded by a pale areola. After injection of mosquito antigen the red spot was smaller and the pale areola absent. The question is still under investigation.

C. L.

PLAWTOW (K. A.). Ueber das Verhältniss zwischen Chinin, Leukozyten und Parasiten im Blute von Malariakranken. [**Relation between Quinine, Leucocytes and Parasites in the Blood of Malarial Patients.**] —*Arch. f. Schiffs- u. Trop.-Hyg.* 1927. Dec. Vol. 31. No. 12. pp. 587–589. [Lab., Health Commissariat, Nakhichevan, Russia.]

In an earlier work which cannot be traced Plawtow had shown that plasmodia live for 30 days in a hanging drop, in which can be observed the phagocytosis of red corpuscles and their contained parasites. The method lends itself to the study of the action of quinine. He now makes the following statements.

(a) Phagocytosis of all stages of all malaria parasites can be observed at summer temperature in a hanging drop. Unknown factors make of phagocytosis a concerted action occurring immediately on making the drop or even next day. Its time has no connexion with malarial attacks. Using the known factor of raising the temperature from 13° to 17° R. resting leucocytes can be rendered active in 10–30 minutes. The polynuclears and monocytes act as phagocytes and a phagocyte can swallow several infected erythrocytes but apparently cannot be induced to enjoy another such meal. In a smear made from a hanging drop free parasites may be found.

(b) The action of quinine on leucocytes does not prevent their engulfing and dissolving red cells and parasites leaving only melanin. Later the leucocyte dies. This phagocytosis may occur after quinine administration either in the blood stream or hanging drop, and a leucocyte which has so fed in the blood stream will feed again in hanging drop, but no leucocyte will take two meals in a hanging drop. These meals have no relation to the malarial attack wherever partaken of. Varying degrees of digestion of parasites and erythrocytes indicate different meals.

(c) The effect of quinine on the parasites is such that parasites spared by leucocytes live several days in the blood of those treated by quinine. Escape of parasites from erythrocytes under the influence of quinine was not observed.

(d) The technique would seem to have already been described. It is here noted that at a temperature of 37° C. the phenomena mentioned are so quickly enacted to be properly observed. It is advised to leave the preparation over night at a temperature of 20–23° C. and the method is recommended as being simple and worth investigating for the knowledge it will bring.

C. L.

KONSULOFF (St.). Ueber die Ursachen der aktiven und latenten Perioden der Malaria. [**Causes of Active and Latent Periods of Malaria.**]—*Arch. f. Schiffs- u. Trop. Hyg.* 1928. Feb. Vol. 32. No. 2. pp. 57–62. With 2 text figs. [10 refs.]

The pith of this paper lies in the line and a half which state that the characteristics of the curve of diffused sunlight correspond to the seasonal curve of malaria. These light curves, as illustrated in the paper, have their maxima (in the northern hemisphere of course) in June or July. No mention is made of the different seasonal maxima which the different kinds of malaria affect.

C. L.

- i. MASELLI (D.). Il sistema nervoso vegetativo nella infezione malarica. [**The Vegetative Nervous System and Malaria.**]—*Polichinico*. Sez. Med. 1927. Sept. 1. Vol. 34. No. 9. pp. 441–460. [13 refs.]
- ii. ——. Lo stato della tiroide nella infezione malarica. [**The Thyroid in Malaria.**]—*Ibid.* pp. 472–481. [9 refs.] [Clin. Med. Inst., Univ. Rome.]
- iii. MACCIOTTA (G.). Sulla possibile influenza della malaria nella e/o-patogenesi del rachitismo. [**Influence of Malaria on the Pathogenesis of Rickets.**]—*Ibid.* pp. 460–471. [7 refs.] [Clin. Pediat. Inst. Univ., Sassari.]

i. Dr. Maselli gives an account of some experiments performed at the Clinic of Prof. ASCOLI in Rome to investigate the condition of the sympathetic nervous system in patients suffering from malaria. Tests were made with atropine, pilocarpine, adrenalin, etc. In the benign tertian malaria an exaggerated excitability of the sympathetic nervous system could be demonstrated at the commencement of an attack, followed by a vagoexcitability at the end of it (for instance, bradycardia). These phenomena were more pronounced in cases of subtertian malaria, where also a marked hypoexcitability of the cardio-vascular system to adrenalin was found.

ii. In another article the author discusses the influence of malaria upon the thyroid gland. His observations on a group of patients suffering from malaria did not reveal any marked changes in the function of that organ. Only in one case was there a slight increase of the circumference of the neck during the attack. Histological examination of the thyroid glands in two fatal cases of subtertian malaria did not show any pathological changes.

iii. In a number of cases of rickets investigated in Sardinia, Prof. Macciotta, of Sassari, finds a connexion between rachitic changes and a malarial infection of the child or of its parents, especially of its mother during the pregnancy. Infantilism and other dystrophic changes following malaria have been described before by others and the author thinks that the influence which malaria exercises upon endocrine glands, upon the function of the spleen and liver, on the haematopoietic system and the mineral metabolism of the body, may favour the development of rickets. He finds an increased elimination of calcium from the body during a malarial attack and ascribes it to the acidity of the blood and to the impairment of function of the spleen.

H. Lwow.

CLEARKIN (P. A.). **Malaria or Meningitis.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1928. Mar. 31. Vol. 21. No. 6. pp. 479–480. [10 refs.]

A European child of 13 months, thought by the parents to have influenza, died after a convulsion on the way to medical aid. At autopsy, eighteen hours later, the condition of liver and spleen was that of chronic malaria. The dura was adherent to the vault and to the pia-arachnoid which was thickened, injected and oedematous. Two to three ounces of cerebrospinal fluid escaped, which contained large gram-positive bacilli, resembling those associated with decomposition, and many malaria parasites, probably subtertian. The meningeal vessels were enormously dilated and packed with parasites, with leakage into the subarachnoid spaces and brain. It is asked "Was this a case of cerebral malaria following on meningitis of other origin, a meningitis of other origin supervening on malaria, or a true malarial meningitis?"

C. L.

HENRIQUES (J. F.). **A Case of Cerebral Malaria.**—*Indian Med. Gaz.* 1928. Jan. Vol. 63. No. 1. p. 18.

A Hindu girl of 14 was seen unconscious with a temperature of 105°. Subtertian parasites were present. She received 12 grains of quinine intravenously, 28 grs. intramuscularly, 75 grs. orally, and 11 plasmochin tablets before the temperature came to normal on the 6th day. Quinine medication had been refused by another practitioner till her temperature fell to 100° "but this never happened, so the patient went on to develop cerebral malaria."

C. L.

PEREIRA (Lafayette). Neuro-impaludismo (Aphasia de Broca—Manifestações cerebellares). [**Malaria affecting Central Nervous System.**]—*Arch. Brasileiros de Med.* 1927. Aug. Vol. 17. No. 8. pp. 767–774. [5 refs.]

A sailor of 24, with *Plasmodium falciparum* in the blood, and a strongly positive Wassermann reaction showed such nervous symptoms as nystagmus, sensory aphasia, and ataxia with lively reflexes and no loss of sensation. Spinal puncture showed albumin 0.22 per cent., glucose 1.3 per cent., a turbidity indicating globulin and a lymphocytosis of 2.2 per cmm. Improvement followed exhibition of quinine and novarsenobenzol. The case is discussed.

C. L.

WESSENHAGEN (G. F.). Maag- en darmstoornissen bij malaria. [**Gastric and Intestinal Disturbances in Malaria.**]—*Nederl. Tijdschr. v. Geneesk.* 1928. Jan. 21. Year 72. 1st Half. No. 3. p. 313.

As an example of predominant gastrointestinal symptoms in malaria, the author describes two cases of children with high temperature, vomiting and diarrhoea. In one case the stools contained blood and mucus. The spleen was enlarged in both cases and malaria parasites were found in the blood. Tests for typhoid and dysentery were negative and the symptoms disappeared rapidly with quinine.

H. Lwow.

STILL (R. M. Lloyd). **A Case of Heat-Stroke combined with Malaria.**—*Jl. Roy. Nav. Med. Serv.* 1928. Jan. Vol. 14. No. 1. pp. 55–56. With 1 chart in text.

A man with high temperature was treated with ice packs, in which collapse came on, until a blood examination showed subtertian malaria. Under quinine recovery seems to have been uninterrupted.

C. L.

TSAKALOTOS (A. E.) & CHOREMIS (K.). Ein Fall von kongenitaler Malaria. [**A Case of Congenital Malaria.**]—*Klin. Woch.* 1927. Nov. 5. Vol. 6. No. 45. pp. 2146-2147. [3 refs.]

Plasmodium vivax was found in the child a month after birth. The history is that the mother had "malaria" at the 8th month, and after quinine treatment miscarried. Owing to her condition, the child was put out to nurse, and began to have fever a week later. The incident occurred in the Province of Helias in the Peloponnese, one of the most malarious areas of Greece.

C. L.

BESELIN (Oskar). Ueber Hörstörungen bei Malaria. [**Affection of the Ear in Malaria.**]—*Abhandl. a. d. Gebiet d. Auslandskunde. Hamburg. Univ.* 1927. Vol. 26. (D., Med. & Vet. Vol. 2.) [Festschrift NOCHT] pp. 37-38.

The writer puts and, as far as he can, answers 3 questions. (1) Does untreated malaria damage the inner ear? An open question only to be answered by combined clinical and post-mortem investigations. (2) Is tabetic deafness bettered by a malaria treatment? Unanswered, but the few cases available suggested that it is not. (3) How may quinine-induced deafness best be avoided? Small repeated doses harm the hearing less than single large ones.

C. L.

HOLLMANN (G. F.). Ueber Veränderungen an den Netzhautgefäßen bei Malaria. [**Changes in the Retinal Vessels in Malaria.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1928. Feb. Vol. 32. No. 2. pp. 82-87 [1 ref.] [German Hosp., Tiflis.]

Hollmann associates with malaria a formidable list of ocular symptoms, of possible diagnostic value when parasites are not found in the peripheral blood. The grounds of diagnosis are so far clarified that, in 440 cases where the changes were not retinal, parasites were found in 36. The retinal changes described affect both eyes equally and include congestion and sinuosity of the retinal vessels, and a strong, linear light reflection not dependent on the intensity of light and showing in places a crystalline effect angular or scalloped, more evident at the margins of the retina and on the veins. At these places there project for 3 or 4 mm. into the vitreous transparent shiny structures, as if some transparent folded membrane were there. Among other conditions described are asthenopia, dilated and sluggish pupils, and congested conjunctivae with a feeling of dryness, itching or burning. The crystalline appearance in the vitreous is attributed to formation of cholesterin.

C. L.

DÜRCK (Hermann). Ueber entzündliche Veränderungen der weichen Hirnhäute am Hirnventrikelpendym bei perniziöser Malaria tropica. [**Inflammatory Changes in Pia Mater and Ventricle Ependyma in Subtertian Malaria.**]—*Abhandl. a. d. Gebiet d. Auslandskunde. Hamburg. Univ.* 1927. Vol. 26. (D., Med. & Vet. Vol. 2.) [Festschrift NOCHT.] pp. 79-88. With 5 figs. on 2 plates. [16 refs.]

Dürck summarizes results of examinations of about 40 brains of those who have died of cerebral malaria. Infiltration varies from a few

sparse lymphoid cells in scattered localities to large collections together with infiltration of blood. In pial veins there are polymorph leucocytic thrombi with almost no parasites or pigment even when capillaries contain many of them. Excellent photomicrographs display the conditions noted as well as the nodules which the writer has previously described. [See this *Bulletin*, Vol. 23, p. 626.]

C. L.

WOLSKI (M. E.) & SCHEWELEWA (E. M.). Zur Pathogenese der Anämia bei Malaria. [**The Pathogeny of Anaemia in Malaria.**]*—Arch. f. Schiffs- u. Trop.-Hyg.* 1928. Mar. Vol. 32. No. 3. pp. 121-137. With 1 chart in text. [27 refs.] [Therap. Clinic, Univ., Samara.]

The conclusions reached are accepted ones. Some toxin, associated with malaria attacks, destroys uninfected erythrocytes and with the attack the faecal excretion of urobilin is increased for about two days. Destruction is greater with severe attacks and it, rather than lessened recuperation, causes the anaemia. The reverse is the case in latent or subfebrile cases. Arsenic should not be given to an already over-stimulated bone marrow. The references are all to German literature which does not cover the whole matter.

C. L.

RUGE (H.). 25 Jahre Malaria-Behandlung im Institut für Schiffs- und Tropenkrankheiten. Beobachtung an 4924 Fällen. [**Twenty-Five Years Malaria Treatment in the Institut für Schiffs- und Tropenkrankheiten**]*—Beihefte z. Arch. f. Schiffs- u. Trop.-Hyg.* 1928. Vol. 32. No. 1. pp. 5-68. With 24 charts in text. [4 refs.]

It is impossible to abstract work representing a close study of nearly 5,000 cases of malaria seen during 25 years. Tertian malaria accounted for 1,024, mostly relapses, the majority acquired in America. An interesting table compares the effect of drugs. For example, in 134 primary cases quinine hydrochloride caused schizonts and gametocytes to disappear in 1·8 and 2·5 days respectively, while in 427 relapses the figures were 2·4 and 2·6. In 26 primary cases under plasmochin, schizonts disappeared in 2·7 and gametocytes in 3 days, the figures for 23 relapses being 2·5 and 3·2. In 275 subtertian malarias quinine hydrochloride caused schizonts to disappear in 2·8 and gametocytes in 13·9 days, the corresponding figures for 30 plasmochin treated cases being 3·2 and 4, while in 35 cases in which the two drugs were combined the figures were 15·8 days for schizonts and 11·4 for crescents. In 47 cases of quartan malaria quinine hydrochloride caused schizonts and gametocytes to disappear in 2·7 and 3·7 days, the corresponding figures for plasmochin being 2 and 4. Blackwater fever occurred in 1·7 per cent. of 61 cases of quartan malaria, 0·57 per cent. of tertian, 2·5 per cent. of 2,867 subtertian, and 1·6 per cent. of mixed infections.

C. L.

- i. MANSON-BAHR (P. H.). **Further Observations on the Effects of Plasmochin and "Plasmochin-Compound" on the Gametocytes of Benign Tertian and Subtertian Malaria.**—*Lancet*. 1928. Jan. 7. pp. 25-26. With 3 text figs. [1 ref.]
- ii. —. **The Treatment of the Malarias.** [Correspondence.]—*Ibid*. Jan. 21. p. 160. [1 ref.]
- iii. Low (G. Carmichael). **Treatment of the Malarias.**—*Ibid*. Feb. 4. p. 259. [2 refs.]
- iv. MÜHLENS. **Plasmochinbehandlung der Malaria.** [**Plasmochin Treatment of Malaria.**]—*Deut. Med. Woch.* 1927. Dec. 23. Vol. 53. No. 52. p. 2202.

i. Dr. Manson-Bahr's records over 8 years in 17 exactly recorded cases, where crescents were as many as from 8 to 132 to every 200 leucocytes and which were put on 2 gm. of quinine hydrochloride daily, show that on the average crescents remained detectable in the blood-stream for 13 days. In two cases crescents were first seen here after the administration of 37 gm. and 28 gm. of quinine. The inference is that quinine is less toxic for the young gametocyte than for other stages of the parasite. In four cases of subtertian malaria, plasmochin was given in daily doses of 0.06 gm. to 0.12 gm. In every instance crescents disappeared from the circulation two or three days before rings, the average time required being 4 days and quantity 0.3 gm. In 6 cases of tertian malaria, gametocytes were as strikingly affected. Regarding plasmochin compound, after 0.03 gm. of plasmochin and 0.375 gm. of quinine sulphate, most gametocytes refused to become spherical and exflagellation could not be induced in any. Within 36 hours, after 0.08 gm. plasmochin and 1 gm. quinine, crescents became deformed, and 24 hours later their disintegration was complete, in some cases the hazy outline of the host cell persisting. The average dosage required for destruction of tertian parasites was 0.12 gm. plasmochin and 1.5 gm. quinine. "The therapeutic effects of plasmochin compound in both forms of malaria has thus been conclusively demonstrated. . . . In order to produce a clinical cure with plasmochin compound it appears necessary to continue in full therapeutic doses (0.06 gm. plasmochin plus 0.75 gm. quinine daily) for three full courses of one week each with intervals of five to seven days in between in order to eliminate the drug from the body." No relapses had occurred.

ii. In a leading article in the *Lancet* attention was called to the conclusions of FISCHER and WEISE that the maximum daily dose of plasmochin should be 0.03 gm. and their conclusions that in this dosage it acted as a provocative; to the experience of BÄRMANN and SMITS that, as Manson-Bahr noted for quinine, crescents might appear in the blood for the first time after administration of plasmochin (0.8 gm. daily) had continued for 5 days; and to the fact that the dosage of plasmochin which caused disappearance of crescents in Manson-Bahr's cases seems to have been two to four times greater than seemed permissible in the future.

Manson Bahr noted that MÜHLENS' original dosage was too high and that the tablets now on the market contained only 0.005 gm. of plasmochin and 0.0625 gm. of quinine and advocates dosage of 12 of these tablets daily.

iii. Low is unconvinced that he has had from plasmochin better results than from quinine, iron and arsenic, notes the uselessness of destroying crescents and leaving unhurt rings to produce more, and

suggests that the fact that it is necessary to combine plasmochin with quinine points its own moral.

iv. Mühlens writes that he is represented as advising both two and four tablets of plasmochin compound three times a day. The discrepancy has arisen because the manufacturers have put up "dragées" each containing 0.01 gm. plasmochin and 0.125 gm. quinine and "tablets" containing half that amount. In order to prevent all possibility of confusion he states explicitly that the dosage for tertian and quartan malaria is one plasmochin tablet three times a day each containing 0.02 gm. [that is 0.06 gm. daily] while for subtertian malaria and as a prophylactic the dosage is six plasmochin compound tablets daily in two or in three portions, each containing 0.01 gm. plasmochin and 0.125 gm. quinine [that is 0.06 gm. plasmochin and 0.75 gm. quinine or about 12 grains daily]. The issue of the half dose tablets is definitely discontinued.

C. L.

OLIVIER (P. H.) & HULSHOFF (A. A.). De behandeling van malaria met plasmochinum en plasmochinum compositum. [**Treatment of Malaria with Plasmochin and Plasmochin Compound.**]—*Geneesk. Tijdschr. v. Nederl.-Indië*. 1927. Vol. 67. No. 6. pp. 907-921. With 22 charts. [13 refs.]

In this paper with its full protocols of 139 cases, the following conclusions are reached. Plasmochin was taken without protest. Slight cyanosis and abdominal discomfort sometimes occurred. The parasites of tertian and quartan malaria left the blood after a few days, but with relapse in a number of cases. On subtertian rings plasmochin was without influence but crescents disappeared in about 6 days. Plasmochin and quinine combined are to be preferred for this infection, rings disappearing in a few and crescents in about 4 days. They need not be given in the same tablet. It is recommended that they should be continued for 31 days. Plasmochin is well borne where there is oversensitiveness to quinine; it should be given only under strict medical supervision.

C. L.

SCHIASSI (F.) & MERIGHI (G.). Das Plasmochin in der Behandlung der Kinder-Malaria. [**Plasmochin Treatment in Malaria of Children.**]—*Klin. Woch.* 1928. Apr. 1. Vol. 7. No. 14. pp. 640-641. [Civil Hosp., Ravenna.]

The advantages of plasmochin for children are its tastelessness and its solubility. Cyanosis is the prominent evidence of overdosage, but has usually been accompanied by no other general or local symptom to suggest that it constitutes a toxic symptom of importance. The dosage advised is 1 to 6 months 0.5 cgm. twice daily, or 3 times daily for the first 2 days; 6-12 months 1 cgm. twice daily, but often 0.5 three times daily after the first 2 days; 1 to 2 years 1 cgm. twice daily after 1 cgm. three times daily for the first two days; 2 to 3 years 1 cgm. three times daily reduced to twice daily when cyanosis appears; 3 to 6 years 1 cgm. three times daily, or 4 times for the first 3 days; 6 to 12 years 4 cgm. daily, reduced to three times daily when cyanosis appears.

C. L.

BENECKE. Ist Plasmochin für die Anwendung durch Laien geeignet? (Ein Beitrag zur Plasmochinbehandlung.) [**Should Plasmochin be employed by Laymen?**—*Abhandl. a. d. Gebiet d. Auslandskunde. Hamburg. Univ.* 1927. Vol. 26. (D., Med. & Vet. Vol. 2.) [Festschrift NOCHT.] pp. 23-24.

During MÜHLENS' visit to Guatemala early in 1927 the question of the administration of plasmochin by laymen was raised at a hacienda belonging to the Central American Plantations Corporation. Since the manager was German with German assistants there was, it is definitely stated, a guarantee that MÜHLENS' measures would be carried out conscientiously as planned. It is concluded that the administration of plasmochin can unhesitatingly be handed over to laymen. This conclusion is based on experience with one case of tertian and two of quartan infection who received plasmochin, and of 19 subtertian malaria patients who received plasmochin and quinine at the adult daily rate of 0.05 gm. of plasmochin and 0.65 gm. or 9 1-3 grs. of quinine daily. [The national emphasis or bias above expressed makes it seemly to note that the Germans, FISCHER and WEISE (this *Bulletin* Vol. 25, p. 135), have concluded that the maximum daily dose free from ill consequences is 0.03 gm. and FLETCHER & KANAGARAYER (*loc. cit.*, p. 134), non-Germans, have written of plasmochin "It must be administered under medical care."]

C. L.

MOLLOU (W.). Ueber die gametenzerstörende Wirkung des Plasmochins. [**The Destruction of Gametes by Plasmochin.**—*Arch. f. Schiffs- u. Trop.-Hyg.* 1928. Mar. Vol. 32. No. 3. pp. 116-119. With 1 chart & 1 coloured fig. in text. [2 refs.] [Med. Faculty, Univ., Sofia.]

One case is described. Infection was tertian and subtertian. Under 1.5 gm. of quinine urethane daily and intramuscularly for 5 days subtertian rings disappeared, crescents appeared and tertian gametocytes persisted. After another 5 days of plasmochin tablets—daily quantity 0.1 gm.—crescents disappeared, tertian gametes having done so after 1 day. A coloured figure shows the appearance of degenerating crescents.

C. L.

CORDES (Wilhelm). Zwischenfälle bei der Plasmochinbehandlung. [**Incidents in Plasmochin Treatment.**—*Arch. f. Schiffs- u. Trop.-Hyg.* 1928. Mar. Vol. 32. No. 3. pp. 143-148. [4 refs.] [United Fruit Co., Preston, Cuba.]

In the Year Book, for 1926, of the United Fruit Company Cordes stated that among 72 malaria cases treated with plasmochin compound (0.08 gm. of plasmochin and 1 gm. of quinine daily) there were 4 cases of serious illness with one death (*ante*, p. 134) and that a separate communication would be issued regarding them. The four cases referred to in the present communication as occurring in the United Fruit Company's service are evidently the same. The deaths were actually two, not one. The toxic symptoms were drowsiness or coma, pallor with marked drop in red corpuscles and haemoglobin,

exhaustion and yellowness ; haemoglobin fell as low as 30, there was a leucocytosis to 24,000 with many young white forms difficult to differentiate. On one blood film SCHILLING reported noted excess of blood platelets and concluded that the condition was one of severe toxic anaemia, with the appearance of damaged bone marrow elements ; such a condition he knows only in an experimental toxic anaemia with severe poisoning of the blood. It resembles the condition in severe cases of blackwater fever and verruga peruviana.

C. L.

SQUIRES (H. C.) **Toxic Symptoms from Plasmochin.** [Correspondence.] —*Lancet*. 1928. Mar. 31. p. 673.

Squires has been using plasmochin with satisfaction for over a year. Within the week before writing he had had four cases, all British, two with subtertian parasites, two clinically diagnosed and all receiving plasmochin in doses not exceeding 0.06 gm. in 24 hours and in no case given for more than 5 consecutive days. The symptoms were cyanosis, very marked in 2 cases, and abdominal pain completely preventing sleep in 2 patients, who complained bitterly that they felt they had been poisoned. The drug was from a fresh supply which had been in Khartoum for less than six weeks.

C. L.

ORACHOWATZ (D.). Die Cyanose bei Plasmochinbehandlung. [**Cyanosis in Plasmochin Treatment.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1928. Mar. Vol. 32. No. 3. pp. 119–121. [2 refs.] [Physiol. Inst., Univ., Sofia.]

Two cases of plasmochin cyanosis were investigated, the dosage received not being stated. The oxygen capacity of the blood was reduced to two-thirds of the normal as the result of the conversion of haemoglobin into methaemoglobin. The writer notes that this is no inconsiderable drop and comments unfavourably on SCHLESINGER's curious recommendation that plasmochin should be administered in croupous pneumonia.

C. L.

LONGO (Domenico). Contributo allo studio della plasmochinoterapia della malaria. (**Contribution to the Study of the Plasmochin Treatment in Malaria.**)—*Riv. di Malariologia*. 1928. Jan.–Feb. Vol. 7. No. 1. pp. 31–37. With 4 graphs. [6 refs.] [English summary p. 81.] [Colonial Hosp., Tripoli.]

" In the Colonial Hospital, Tripoli, the author has treated with the simple plasmochin, 24 tertian cases, and with the combined plasmochin, 5 subtertian (tropical) and 1 quartan case. The drug was first given 4–8 hours before the attack. A plasmochin resistant tertian fever disappeared by the administration of the combined plasmochin. In the other 30 cases fever ceased after 2 days and the parasites (even the subtertian gametocytes) disappeared from the peripheral blood after 4–5 days. The remedy was then given for at least a period of a month, without interruption or with an interval of 5–10 days. It was well tolerated, except in two subtertian cases, in which a light cyanosis and gastric disturbances of short duration

appeared after 3-4 weeks of uninterrupted intake of the drug. Anaemia gradually disappeared. Good results have been obtained in a tertian pregnant woman, in a subtertian quinine resistant case and in a subtertian woman who could not easily take quinine.

"The comparison with 20 quinized tertian cases has shown that equally good results were obtained as by the plasmochin treatment, which, however, was followed more willingly, because it does not provoke the disturbances of 'cinchonism'."

C. L.

MORISHITA (Kaoru Moru) & NAMIKAWA (Hiroshi). Betrachtungen ueber die Plasmochin-Behandlung der Malaria. [**Plasmochin Treatment of Malaria.**—*Taiwan Igakkai Zasshi* (Jl. Med. Assoc. Formosa). 1927. Dec. No. 273. German summary pp. 1-2. [In Japanese.] [Central Inst. for Scient. Research, Formosa, Japan.]

Plasmochin treatment [dosage not given] was undertaken as follows, the cases being followed up for 8 weeks—Plain plasmochin in 7 acute cases of tertian malaria, relapse occurring in 1 of 4 cases followed up. It again relapsed after a second treatment and had been refractory to quinine. The same drug in 2 quartan cases, one relapsing. Plasmochin compound in 7 cases of subtertian malaria, 2 cases were observed afterwards and neither relapsed. Three of these cases show the symptoms of blackwater fever appearing on the third day. All were country dwellers. There were seen in some cases, cyanosis, tachycardia and abdominal, especially epigastric, pain. On the other hand, in 4 cases of quinine sensitiveness in which this was exhibited with the compound tablets, simple plasmochin is described as acting well.

C. L.

SCHULEMANN (W.), SCHÖNHÖFER (F.) & WINGLER (A.). Beiträge zum chemischen Nachweis des Plasmochins. [**Contribution to the Chemical Detection of Plasmochin.**—*Abhandl. a. d. Gebiet d. Auslandskunde. Hamburg. Univ.* 1927. Vol. 26. (D., Med. & Vet. Vol. 2). [Festschrift NOCHT.] pp. 507-511.

The author finds that chloranil, or tetrachloro benzoquinone, is a delicate reagent for plasmochin forming with this drug an intensely blue dye, and has devised a method of applying this reaction to the estimation of plasmochin in urine.

Two or three hundred cc. of urine are mixed with 20 cc. of 50 per cent. caustic potash solution to set free plasmochin base, which is then extracted, by agitation with ether three times using 30 cc. each time. The total ethereal extract (90 cc.) is filtered, washed twice with 10 cc. of water containing 2 drops of normal soda solution and the plasmochin then extracted from it by thorough agitation with 6 cc. of 2 per cent. acetic acid solution. The latter is separated, warmed on the water bath to remove dissolved ether, and is then ready for application of the colour reaction. Three cc. of acetic acid is added and about 0.05 gm. of chloranil and the mixture, contained in a test tube of 1.6 cm. diameter, heated for about 1.5 minutes in a free flame. If more than 1 part of plasmochin in 50,000 is present a blue or blue-green coloration appears. The solution is then cooled, left for some minutes to allow excess of chloranil to crystallize out, filtered and to the filtrate 1 to 1.5 cc. of ether is added. The ether remains in solution until the acetic acid is partially neutralized by the addition of a few drops of 50 per cent. caustic potash solution, when it separates as an intensely blue upper layer. Applied in this fashion 100 cc. of urine containing 1 in 2,000,000

of plasmochin gives an ethereal layer of bluish-green colour. The presence of quinine in the urine does not interfere with the test; normal urine free from plasmochin is coloured pink to bluish violet, but this colour does not pass into the ethereal layer, which in these circumstances remains pale yellow.

In one experiment in which 0.04 gm. of plasmochin was taken on each of three consecutive days, plasmochin was found in the morning urine (300 cc.) and in the day's urine (600 cc.), but none could be detected in the urine on the fourth or sixth day.

T. A. Henry.

FABRE (Henri). Comparateur à quatre tubes pour le dosage de la quinine dans les urines, à l'aide du reactif de Tanret et d'une solution titrée de quinine. [**Determination of Quinine in Urine.**]—*Bull. Soc. Path. Exot.* 1927. Dec. 14. Vol. 20. No. 10. pp. 972-973. With 1 chart. [Bact. Lab., Pointe-à-Pitre, Guadeloupe, W. Indies.]

Fabre points out that ROBINEAU's calculations for the determination of the quinine content of urine by his four tubes [*ante*, p. 144] does not take account of the dilution of the fluid produced when many drops of quinine solution have to be added. He gives a curve showing the correct answers, which however, is printed so small as to be difficult to read.

C. L.

McnABB (Paul E.) & STEWART, Jr. (Thomas H.). **Experiences in the Quinine Prophylaxis of Malarial Infections in the Panama Canal Zone.**—*Amer. Jl. Trop. Med.* 1927. Nov. Vol. 7. No. 6. pp. 357-368. With 1 map & 1 chart in text. [2 refs.]

The "sanitized" area of the Panama Canal Zone is a narrow strip bordering part of the Canal and surrounding Panama and Colon and the larger towns. In 1926 three companies of engineers, each with a personnel of about 75, were engaged in mapping unsanitized, heavily malarious, regions. A daily ration of 15 gr. [1 gm.] of quinine was compulsory, was taken under supervision and, the writers are satisfied, was rarely missed. Of the 225 men, only 14 showed malaria during four and a half months in the jungle. During the following seven and a half months 92 further cases occurred, while in a control group of the same size only 8 cases appeared. The method of appearance of malaria constituted a veritable epidemic. In the first two weeks after ceasing quinine subtertian cases were numerous, reaching their peak in the second week and ceasing altogether after 5 weeks in all. Tertian infections were absent until after the second week and continued to develop during the whole period of observation. These facts are confirmatory of the conclusions that 15 grs. of quinine will not prevent malaria, but by suppressing symptoms and keeping men on their feet has a high military value in a malarious region.

C. L.

PANAMA CANAL ZONE. **Unprecedented Reduction in the Incidence of Malaria among Residents of Canal Zone Towns and the Cities of Colon and Panama.**—4 pp. With 1 fig.

Col. W. H. CHAMBERLAIN reports that the malaria rate in the Panama Canal Zone during 1927 was 10.7 per thousand among 13,560 employees,

there being 38 cases among 2,947 whites. Twenty-one of these certainly, and others probably, obtained their infections outside the "sanitated" towns. The per mille figures for 1905 were 514. The steady improvement since then "is believed to have resulted mainly from consistent extensions and improvements of the anti-mosquito drainage systems."

C. L.

HEWETSON (W. M.). **Quinine in Obstetric Practice.** [Correspondence.] —*Brit. Med. Jl.* 1928 Jan. 28. p. 157.

Since instituting a regular daily dose of $2\frac{1}{2}$ grains of quinine hydrochloride for six weeks, and of 5 grains for one week before the expected date of confinement, Hewetson (Rhodesia) has not been troubled by rises in temperature after confinement. The régime is insisted on, whether or not there is a history of malaria, and it is based on his experience that a large proportion of clinically typical malarias give negative microscopic results in the hands of experts, so that rises in temperature after confinement used to give him considerable anxiety.

C. L.

URCHS (Oswald). *Drei Jahre Malaria-Kontrolle in Holländisch Guyana (1923-1926).* [**Three Years' Malaria Control in Dutch Guiana.**]—*Abhandl. a. d. Gebiet d. Auslandskunde. Hamburg. Univ.* 1927. Vol. 26. (D., Med. & Vet. Vol. 2.) [Festschrift NOCHT.] pp. 561-572. With 1 chart in text. [7 refs.] [Hosp., Surinam Bauxite Co., Moengo Mines, Dutch Guiana.]

The workers in bauxite mines in Dutch Guiana are partly imported Javanese, and partly local persons of mixed breed. The antimalarial measures carried out include the filling of two swamps, planting of papaya trees, general care of water, attention to housing including the burning down of unsatisfactory huts, screening, and quinine administration. The effects are shown in a table dealing with the condition of the Javanese in 1923, and at the end of their contract period in 1926. The result of blood examinations in October 1923, May and October, 1924, and May 1925 gave these percentages of positives—adults 27.7, 11.6, 11.8, 10.1; children 58.6, 66.6, 70.3, 41.4. The Javanese suffered more severely than the natives. The infection index of the mosquitoes in 1921 was 15 per cent. and in 1922 5 per cent. as determined by BONNE, the species being *argyrotarsis*, *tarsimaculatus*, *mediopunctatus* and *pseudomaculipennis*.

C. L.

CEYLON. **Malaria Control in Ceylon.** Memorandum prepared by the Department of Medical and Sanitary Services, June, 1927.—6 pp. M/60/27.

A pamphlet giving particulars of the constitution and government, physical, climatic, and economic conditions, population and medical and sanitary services of Ceylon. Anti-malarial work done and precautions adopted are noted. There are two Boards for Malaria Control; one is the Anti-malaria Advisory Board, which receives, considers and advises on reports, and the other the Departmental Committee on Malaria, which initiates and controls the actual work through its executive officer, the Superintendent, Anti-malarial Campaign.

C. L.

BOSE (Krishnasekhar). **Malaria Control at Birnagar 1927.**—*Calcutta Med. Jl.* 1927. Dec. Vol. 22. No. 6. pp. 285–327. With 1 map & 2 charts in text & 5 plates.

In 1856 this municipality had a population of 40,000, and acted in 1862 as the focus whence malaria spread to all Bengal. Its present population is 2,300 and it is, or was, one of those almost derelict lethargic towns which malaria has produced in parts of that province. In 1923 a local public health society was instituted, of which the author, a layman, is honorary secretary, devoting his Sundays and holidays to the work. This report deals with the year 1927, with references to earlier years [see *Bulletin of Hygiene*, Vol. 1, p. 568; Vol. 3, p. 586], is written in a sober spirit and makes a notable record. The whole area has been surveyed and the anopheles larvae found in each collection of water are known, thanks in the main to Mr. IYENGAR, Entomologist, Malaria Research Laboratory, Calcutta. Similarly the good offices of Dr. C. A. BENTLEY, Director of Public Health, have secured large free gifts of quinine which has been distributed under good arrangements. The spleen index has fallen from the eighties to the low twenties. At the same time a beginning is being made in clearing the municipality of the jungle under which, for years, it has been drowned, and special terms have been obtained from the railway for the export of the felled trees as firewood. Annual expenses, collected locally, have risen to about Rs.4,000, the accounts being edited by the Government Circle Officer. The action of heavy rain here causes a muddy water with death of larvae, only newly hatched ones being found later when the water clears.

C. L.

WEHRLE (W. O.). *Praktische Erfahrung mit der Malariaphylaxe in Monrovia (Liberia).* [**Malaria Prophylaxis in Monrovia.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1928. Apr. Vol. 32. No. 4. pp. 194–197.

The writer refers to the daily use of quinine as a prophylactic on the West Coast of Africa, the doses employed being by French 0.25 gm., English 0.324 gm. (5 grains) and German 0.4 gm. During the last 4 years he has had under observation on the average 70 to 100 Europeans. He is not in favour of this daily dose, but advises Ziemann's German method of 1 gm. on Sunday, and 1 gm. in the middle of the week; or plasmochin 0.02 gm. daily or 0.06 gm. twice weekly; or again, plasmochin compound with 0.02 gm. plasmochin and 0.25 gm. quinine daily or 0.05 gm. of plasmochin and 0.625 gm. quinine twice weekly. He has had no fever appear in plasmochin-taking cases, but reports no details, nor has he had any blackwater fever in Europeans during the last 4 years.

C. L.

ŠFARČIĆ. *Malaria in Dalmatien und ihre Bekämpfung.* [**Antimalarial Measures in Dalmatia.**]—*Abhandl. a. d. Gebiet d. Auslandskunde. Hamburg. Univ.* 1927. Vol. 26. (D., Med. & Vet. Vol. 2.) [*Festschrift NOCHT.*] pp. 532–538. With 3 text figs. [2 refs.]

The immense amount of malarial work done in Dalmatia is mentioned. All three species of plasmodium are present in varying proportions, subtertian reaching as much as 66 per cent. The principal

antilarval work in this arid country lies in the "lokvas" but their supply of water to man and beast cannot be interfered with. The solution advocated is their enclosure and their connexion through a filter bed with a deep well. *Gambusia* is reported as having proved most effective and it is suggested that it will supplant other antimalarial measures.

C. L.

WOSKRESSENSKI (B.) & BRENN (H.). Das Trockenlegen der Reisfelder für kurze Zeit als prophylaktisches Mittel im Kampf gegen die Malaria in Aserbeidshan. [**Malaria Prevention in Azerbaijan by Desiccation of Rice Fields.**—*Arch. f. Schiffs- u. Trop.-Hyg.* 1928. Jan. Vol. 32. No. 1. pp. 37-40.]

The rice fields about Baku support in abundance *A. maculipennis* in summer, *A. pseudopictus* preponderating in August; *A. superpictus* and *A. bifurcatus* are also present. Their water contains sodium chloride in percentage of 0.001 to 0.006, has pH of 7.6 and the fields lie close to the houses in a densely populated country which lives by them. While it is pointed out that anopheles eggs will survive on moist earth for 5 days and that on the addition of water larvae will immediately hatch out, it is advised that irrigation should cease for 3 days in every 15. The spleen rate is 50 per cent. and anopheles larvae 3 to 22 per square metre.

C. L.

FERMI (Claudio). Sulla zooprofilassi antimalarica. [**Antimalarial Zooprophyllaxis.**—*Malariologia.* 1928. Jan. 31. Ser. 3. No. 1. pp. 6-9. With 2 text figs. [13 refs.]]

In this paper are given for a number of villages the population of men and cattle, and the malarial morbidity. They may be summarized thus: number of human beings/number of cattle, percentage morbidity—125/1 and 10%; 19/1 and 12%; 18/1 and 10%; 13/1 and 5%; 10/1 and 15%; 5/1 and 60%; 4/1 and 2%; 2/1 and 66% to 80%; 1/1 and 100%; 1/2 and 100%; 1/3 and 100%; 1/10 and 65%; 1/21 and 100%. [Regarding zootropic deviation, if the figures show anything they suggest that the more cattle the more malaria.]

C. L.

SOUTH AFRICAN RED CROSS SOCIETY (Transvaal) & UNION DEPARTMENT OF PUBLIC HEALTH. **First Measures in Malarial Prevention for Farmers and Settlers.** 2nd Revision. (Revised by G. G. HAY, with Chapter on Mosquito-Proof Housing by G. A. PARK ROSS).—36 pp. With 20 figs. In English and Dutch. Undated. S.A. Red Cross Society, Johannesburg. P.O. Box 3266. [356 (Health).]

The second revision of a practical pamphlet in English and Dutch, dealing with the causation, prevention and treatment of malaria. It is clearly written, but an advised *average* daily dose of 40 grains of quinine is perhaps likely to produce such obvious distaste for treatment that it may defeat its end.

C. L.

SEPULCRI (Piero). La malaria all' Ongaro inferiore. Contributo di dettaglio alla conoscenza della malaria nel Veneto. (**Malaria in the Zone of the Lower Ongaro.**)—*Riv. di Malariologia*. 1927. Nov.-Dec. Vol. 6. No. 6. pp. 910-934. With 1 map in text. [English summary p. 1011.]

The English summary notes that results improved when quininization of patients was added to the use of Paris green and petroleum as larvicides and to the catching of adult mosquitoes.

C. L.

- i. JAMES (S. P.). **History of a Group of Anopheles Mosquitoes infected with *Plasmodium vivax* (Grassi & Feletti).**—*Abhandl. a. d. Gebiet d. Auslandskunde. Hamburg. Univ.* 1927. Vol. 26. (D., Med. & Vet. Vol. 2.) [Festschrift NOCHT.] pp. 220-222. [1 ref.]
- ii. —, NICOL (W. D.) & SHUTE (P. G.). **Note on a New Procedure for Malaria Research.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1927. Nov. 25. Vol. 21. No. 3. pp. 233-236. With 1 chart in text. [2 refs.]

i. Six hundred female *A. maculipennis* were collected from a pigsty in England on August 23rd, 1926, some then containing blood. On August 24th and 7 following days, the batch was fed on a gametocyte carrier of *P. vivax*, being kept until September 6th at 23° C. in an incubator, whose air was as nearly saturated with moisture as possible; and thereafter at room temperature (15° C. to 16° C.), in a cool chamber (13° C.), or in the ice chest (4° C. to 5° C.). As the mosquitoes died, some were dissected. Oöcyst infection in these reached 100 per cent. on September 7th and had disappeared by October 18th. Sporozoite infection in the dead reached 97 per cent. infection by September 14th, 100 per cent. by September 28th, remaining at this level till October 25th and then falling, till on November 23rd no sporozoites were found, while during the week before 7 patients bitten had failed to become infected. It was concluded that the batch was non-infective. On November 23rd, three months after the original infection, the 27 survivors of the batch were fed on a patient whose blood contained gametocytes who had earlier been infected by mosquitoes of the same batch. Oöcysts were present in specimens dissected on December 2nd and sporozoites in all specimens dissected after December 12th. Kept in the ice chest between applications, they infected patients on January 13th, 17th and 28th. On February 23rd one of two surviving specimens was killed, and contained a few oöcysts, and numerous sporozoites of normal appearance and activity in the salivary glands. The last survivor died on March 10th. In another experiment with seven mosquitoes of the same batch, mosquitoes fed on October 29th were at once transferred to the ice box and kept there continuously at a temperature between 3° C. and 6° C. for 44 days. Five were still alive. One was dissected and contained numerous sporozoites of normal appearance. Three of the four remaining mosquitoes bit a patient, who developed typical malaria 14 days later.

ii. This note describes a precise method for producing sporozoite infection. The salivary glands of one or more infected mosquitoes are dissected out in a drop or two of blood serum. If sporozoites are present the glands are squeezed through the cover and the expressed parasites washed out by adding more serum, 1 to 1.5 cc. sufficing to

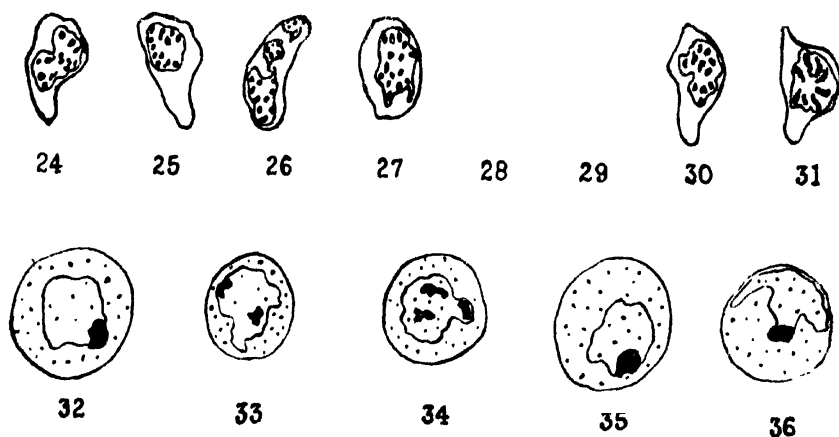
recover them. This is taken up little by little during the washing into a hypodermic syringe and injected into a patient. It has been successful on all (five) occasions up to the time of report, incubation in four intravenous injections occupying 10, 12, 10 and 6 days and in one subcutaneous, 13 days. A further application of the principle was made by dissecting out the salivary glands of two infected mosquitoes in a 1 in 5,000 solution of quinine bisulphate, drawing 1 cc. of the solution containing many sporozoites into the syringe, leaving for 15 minutes and injecting intravenously. The first acute attack, with *P. vivax* in the blood, followed 10 days later.

[This observation should shake the confidence of those who still hold that prophylactic quinine prevents infection. In conjunction with the methods used in the first paper it will permit of the application of much more exact and certain methods in the study of transmission of sporozoite infection.]

C. L.

RATCLIFFE (Herbert L.). **The Relation of *Plasmodium vivax* and *Plasmodium praecox* to the Red Blood Cells of their Respective Hosts as determined by Sections of Blood Cells.**—*Amer. Jl. Trop. Med.* 1927. Nov. Vol. 7. No. 6. pp. 383-388. With 36 text figs. [4 refs.] [School of Hygiene, Johns Hopkins Univ., Baltimore, Md.]

Ratcliffe mentions the conclusions of LAWSON, SINTON, and DE LANGEN that malaria parasites are extracorpuseular. On consideration he questions LAWSON because she studied smears, SINTON because in changing the tonicity of the solution he may have made parasites



Figs. 24 to 31 are camera lucida tracings of cross sections of human blood cells infected with *Plasmodium vivax*.

Figs. 32 to 36 are typical forms of *P. vivax* in blood cells from smears of the same case.

[Reproduced from the *American Journal of Tropical Medicine*.]

change their positions in the red corpuscles, and DE LANGEN because the parasites he saw floating freely in the hanging drop may have been gametocytes and because he could himself find, on repeating his experiment with canary blood and *P. praecox*, no decrease in asexual

forms in proportion to the total red corpuscle count. He has accordingly embedded and sectioned infected bird and human blood. The sections for the former were 2μ thick and for the latter 1.5μ . In no case has he found any parasite so placed as to be considered as extracellular or even as merely deeply imbedded in the corpuscle. His claim is supported by a number of camera lucida drawings taken from transverse sections only. They show the human corpuscle no longer a hollowed disc, and in all cases the erythrocytic tissue completely encloses the parasite. "The parasites have been found invariably to be intracellular."

C. L.

THOMSON (J. G.). **Stippling of the Red Cells in Malaria.**—*Proc. Roy. Soc. Med.* 1928. Jan. Vol. 21. No. 3. pp. 464–467 (Sect. Trop. Dis. & Parasit. pp. 18–21). [18 refs.]

Thomson gives the history of Schüffner's dots in corpuscles harbouring *P. vivax* and of Stephens' and Christophers' dots and those of Maurer in those parasitized by *P. falciparum*. Prior to 1922 he had stained thousand of slides and never seen Stephens' and Christophers' dots till he went to Rhodesia, where they were a marked feature as was the altered colouration of the red corpuscles so affected. Is this stippling, it is asked, due to freak or special staining or is it found only at a definite stage in parasitic growth? It does not occur until the rings have reached a considerable size, 18 to 24 hours after the smallest rings have appeared. On the other hand, Thomson instances a class of over 70 using the same batch of films, the same stain and distilled water, with only 3 specimens showing the stippling and altered stain of red corpuscles. Until this staining reaction is understood, it is not possible to determine whether there is value in the suggestion that there is a separate *tenue* variety of the malignant parasite by which these dots are produced.

C. L.

PASTORE (Salvatore). Le modificazioni morfologiche dei globuli rossi nelle diverse specie di infezione malarica. I granuli di Schüffner e le macchie di Maurer. [**Morphological Changes in the Red Cells in the Different Forms of Malaria.**]—*Policlinico*. Sez. Med. 1927. Nov. 1. Vol. 34. No. 11. pp. 541–556. With 12 coloured figs. on 1 plate. [8 refs.] [Anat. Path. Inst., Univ. Rome.]

Schüffner's dots are held not to be formed exclusively in cell parasitism with *P. vivax*, but to be found, though rarely, with *P. malariae*. They are believed to constitute a good basis of differentiation between *P. vivax* and *P. falciparum*. Maurer's dots, it is pointed out, have been reported from all three infections, although almost characteristic of subtertian malaria.

C. L.

WARASI (W.). Das Malariapigment und seine chemische Natur. [**The Chemical Nature of Malaria Pigment.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1927. Sept. Vol. 31. No. 9. pp. 428–431. [11 refs.] [Trop. Dis. Inst., Tiflis.]

Malaria pigment contains iron, but no sulphur or phosphorus. It is insoluble in water, alcohol, ether, chloroform, hydrochloric acid, nitric

acid, sulphuric acid, and caustic soda, and slightly soluble in acetic acid and "Saure Ather." Its percentage chemical analysis is carbon 51, hydrogen 7.6, nitrogen 13.5, oxygen 22.5 and iron 2.9, corresponding to an empirical formula of $C_{84}H_{152}N_{20}FeO_{82}$. It is thought probable that malaria pigment stands nearer to iron-containing melanin than to haematin.

C. L.

ROMBY (Paolo). I rilievi clinici e gli accertamenti di laboratorio nella lotta contro la malaria. [**Laboratory Diagnosis of Malaria.**]—*Sperimentale*. 1928. Mar. 17. Year 6. Vol. 82. No. 1-2. pp. 45-56. [11 refs.] [School of Military Hygiene, Florence.]

Romby advises as easy and distinctive the following monochrome staining procedure for plasmodia. Fix in alcohol containing 4 drops of picric acid and 4 drops of acetic acid in 30 cc. Immerse without agitation in [? equal parts of] a solution of 1 per cent. bicarbonate of soda and one made up as follows: Dissolve 0.6 gm. of methylene blue in 100 cc. of a 1 in 10000 solution of caustic potash. The rest of the paper follows ordinary lines.

C. L.

HATTORI (R.). Studien über das Blutbild der Impfmalaria bei der progressiven Paralyse. [**The Blood Picture in Inoculation Malaria in G.P.**]—*Fukuoka-Ikwadaigaku-Zasshi*. (*Fukuoka Acta Med.*) 1928. Jan. Vol. 21. No. 1. German summary pp. 5-7. [In Japanese.]

In subcutaneously injected malaria an increase in polymorphs precedes the first attack and, as this begins, myelocytes may rise to 15 per cent. and plasma cells to 10 per cent. Eosinophils are lessened during incubation and may increase to an eosinophilia after a number of attacks. The percentages of lymphocytes, large mononuclears and intermediate forms are not altered. Convalescence is associated with a strong eosinophilia, and with a mononuclear increase. Numbers and colour of the red corpuscles begin to alter before the first attack.

C. L.

PIANA (Giovanni Andrea). L'iperglicorachia importante elemento di diagnosi nelle sindromi perniciosanti malariche dell'infanzia. [**Hyperglycorrhachia in the Diagnosis of Pernicious Malaria in Childhood.**]—*Pediatria*. 1928. Jan. 1. Vol. 36. No. 1. pp. 24-38. [21 refs.] [Inst. of Clin. Pediatrics, R. Univ. Sassari.]

Piana has examined the sugar content of blood and spinal fluid of 20 children varying in age from 6 weeks to 7 years. Twelve were ordinary cases of malaria and 8 were classed as pernicious; that is to say "meningeal" symptoms were present. In the normal cases the sugar content of the blood, apparently estimated in 3 only, lay between 1.45 and 1.56 per cent. In 10 of these normal cases the spinal fluid content lay between 0.7 and 0.9, in one it was 1.17 and in the

twelfth 6.8. In the pernicious cases the sugar content of the blood was, in the 4 in which it is stated, 1.97, 2.87, 4 and 4 while that of the spinal fluid lay between 1.35 and 1.81 in six, was 2 in one and 3 in the eighth case. There is in general a sharp increase of these contents in the grave cases.

C. L.

KIKUTH (Walter) & TROPP (Gaspar). Studien ueber Vogelmalaria. [**Bird Malaria Studies.**]—*Abhandl. a. d. Gebiet d. Auslandskunde, Hamburg. Univ.* 1927. Vol. 26. (D., Med. & Vet. Vol. 2.) [*Festschrift NOCHT.*] pp. 236-245. [16 refs.] [Inst. for Ship & Trop. Diseases, Hamburg.]

Reinfection in 27 canaries, which had been infected 4 weeks to 5 months earlier, failed while controls became infected. Of 37 infected canaries, kept under observation for 4 months, spontaneous relapse occurred in 67.5 per cent.—in March 4 cases, in April 8, in May 15 and in June 8. In one case parasites were found for 9 days; usually they appeared for one day only. Artificial relapse was induced, by injection of 0.06 gm. of adrenalin, in all but 3 of 19 birds. In birds receiving adrenalin, quinine does not cure; they eventually die. Birds' faeces always contain blood to the spectroscope but not to the guaiacum method. Where this latter test was applied to the faeces toluylendiamin administration gave a positive reaction; quinine methylene blue, myosalvarsan and plasmochin a negative one.

C. L.

KENYA & EAST AFRICAN MEDICAL JOURNAL. 1927. Sept. Vol. 4. No. 6. pp. 185-188.—**Simple Notes on Some Tropical Diseases. A Popular Account of the Commoner Diseases of East Africa, with Hints on General Lines of Treatment, for the Use of those out of Reach of Immediate Medical Assistance. No. 1. Malaria.**

The first of a series of papers giving hints for laymen, isolated from medical aid, on the commoner diseases of East Africa. It is just what is needed from its beginning to the final words, "Because we have ventured to offer advice on the treatment of simple cases of malaria, it by no means follows that the disease in its malignant form can ever be left to the sole care of unqualified persons."

C. L.

MONTELEONE (Remo). L'insufficienza respiratoria nella malaria acuta e cronica. [**Respiratory Insufficiency in Acute and Chronic Malaria.**]—*Policlinico. Sez. Med.* 1927. Nov. 1. Vol. 34. No. 11. pp. 557-564. With 4 graphs. [5 refs.] [Inst. of Clin. Med., Univ. Rome.]

Monteleone finds that during acute malarial attacks with rise in temperature there is a diminution in the respiratory or vital capacity. It is attributed not only to increased volume of liver and spleen but also possibly to a subdiaphragmatic hepatitis and splenitis.

C. L.

BENTMANN (E.). Gibt es noch autochthone Malaria im Rheintal? [**Is Malaria still Indigenous in the Rhine Valley?**]—*Abhandl. a. d. Gebiet d. Auslandskunde, Hamburg Univ.* 1927. Vol. 26. (D., Med. & Vet. Vol. 2.) [Festschrift NOCHT.] pp. 25–36. [12 refs.]

The writer cannot agree that there is a focus of endemic malaria in the Rhine Valley. There have been sporadic cases since it was introduced there in 1915 by Russian and Roumanian prisoners, but the prevalence of anopheles is not such as to spread it widely.

C. L.

GOUGEROT. Malaria spontanée préventive impuissante et malariathérapie "guérissant" une P.G.P. [**Natural Malaria not Preventive. Malaria Therapy "cures" General Paralysis.**]—*Bull. Soc. Française de Dermat. et Syph.* 1927. Nov. No. 8. pp. 715–717.

A man who had acquired syphilis 11 years earlier and had had malaria for 2 or 3 years of that time developed general paralysis. Malaria was transmitted to him and he had 11 attacks of high fever during 30 days with rapid mental improvement.

C. L.

LEE (C. U.) & MELENFY (H. E.). **Malaria in a Village near Peking.**—*China Med. Jl.* 1927. Dec. Vol. 41. No. 12. pp. 989–992. With 1 chart.

In the village Ch'engfu near Peking the spleen rate under 10 was 13.8 and from 11 to 15 was 7.4. Examination was made with the child lying on the right side with the knees drawn up. Malaria begins to increase sharply during May, the first anopheles being found in June.

C. L.

LA FACE (L.) & SELLA (M.). La zooprofilassi nella lotta antimalarica secondo le concezioni di B. Grassi. [**Zooprophylaxis in Malaria Control according to Prof. B. Grassi's Opinion.**]—*Riv. di Malariaologia.* 1927. Nov.–Dec. Vol. 6. No. 6. pp. 935–943. [2 refs.] [English summary pp. 1011–1012.]

The writers claim that GRASSI "was the first to observe the relation between anopheles and domestic animals." Aggregation of anopheles in stables he attributed at first to thermotropism. Later he called in misanthropic races and varying feeding instincts. He never refused to acknowledge the value of zooprophyllaxis, but considered a practical solution difficult.

C. L.

DE MELLO (Froilano) & VERNENCAR (H. P.). Nouvelles études sur les résultats de la *Smalarina Cremonese*. [**Fresh Studies of Smalarina Treatment.**]—*Bull. Soc. Path. Exot.* 1927. Dec. 14. Vol. 20. No. 10. pp. 966–972.

Another report that smalarina is quite useless in malaria.

C. L.

GASASIANZ (A. A.). Schwankungen des amyloklastischen Vermögens des Urins und des Speichels bei Malariakranken. [**Variations of the Amyolytic Property of the Urine and Saliva in Malaria.**]—*Russian Jl. Trop. Med.* 1927. Vol. 5. No. 10. French summary p. 675. [In Russian pp. 624–625. 3 refs.]

Quinine increases the excretion of urine and of amylase and the secretion of amyolytic ferment in the saliva.

C. L.

NEVIADOMSKY (M. M.). Sur le diagnostic du paludisme chronique. [**Diagnosis of Chronic Malaria.**]—*Russian Jl. Trop. Med.* 1927. Vol. 5. No. 9. French summary p. 603. [In Russian pp. 538-542.]

In experience with 795 cases it is concluded that chronic malaria may be febrile, normal, or subnormal. In 30 per cent. it is latent, and splenomegaly is often the only symptom. X-rays show that the spleen is denser than normal, discloses latent forms, and should more frequently be employed.

C. I.

PLEHN (A.). Die Förderung der Malariaforschung durch die moderne Therapie der Metalues. [**The Modern Treatment of Parasyphilis as furthering Malaria Research.**]—*Abhandl. a. d. Gebiet d. Auslandskunde. Hamburg. Univ.* 1927. Vol. 26. (D., Med. & Vet. Vol. 2.) [Festschrift NOCHT.] pp. 409-437. [84 refs.]

A summary of recent work with a useful bibliography.

C. L.

CASTAGNA (Pietrino). L'arsenicoterapia ad alte dosi nella cura dei postumi d'infezione malarica e di forme infettive in genere.—*Gaz. d. Ospedali e d. Clin.* 1927. Aug. 28. Vol. 48 No. 35. pp. 821-826 [29 refs.]

CHATTERJEE (N.). A Case of Malignant Malaria.—*Indian Med. Gaz.* 1928. Jan. Vol. 63 No. 1. pp. 20-21.

FALCÃO (Theophilo). Em torno de um caso de nevralgia facial de origem palustre.—*Brasil-Médico.* 1927. Nov. 19. Vol. 41. No. 47. p. 1233.

FERMI (Claudio). Il risorgimento agricolo, industriale e demografico della Sardegna e la malaria.—*Malariologica.* 1928 Jan. 31. Ser. 3. No. 1. pp. 3-6. [1 ref.]

GUPTA (C. C. Das). Dysphagia as a Complication of Malaria.—*Indian Med. Gaz.* 1928 Jan. Vol. 63 No. 1. pp. 21-22.

LEGER (Marcel). Le paludisme dans ses rapports avec les *Plasmodium* des animaux.—*Rev. Prat. Malad. des Pays Chauds.* 1927. Nov. Year 6. Vol. 7. No. 11. pp. 589-592.

LI (K. H.). What a Mission Hospital can contribute to the Study of Malaria — *China Med. Jl.* 1927. Nov. Vol. 41. No. 11. pp. 931-935.

MOSCHKOWSKI (Sch.). Ueber zweckmassige Chininbehandlung der Malaria — *Arch. f. Schiffs- u. Trop.-Hyg.* 1927. Dec. Vol. 31. No. 12. pp. 589-593. [10 refs.] [Trop. Inst., Moscow.]

MUKERJI (S. B.). Cases of Malaria in a Family — *Indian Med. Gaz.* 1928. Jan. Vol. 63. No. 1. pp. 18-19.

OVAZZA (V. E.). L'indice splenico dei malarici.—*Malariologia.* 1928. Jan. 31. Ser. 3. No. 1. pp. 10-11.

RISACHER (S.). Paludisme et puerpéralité.—*Rev. Prat. Malad. des Pays Chauds.* 1927. Sept. Year 6. Vol. 7. No. 9. pp. 465-481. [15 refs.]

RISQUEZ (Francisco A.). El pigmento melánico en el paludismo.—*Abhandl. a. d. Gebiet d. Auslandskunde. Hamburg. Univ.* 1927. Vol. 26. (D., Med. & Vet. Vol. 2.) [Festschrift NOCHT.] pp. 461-463. [3 refs.]

SIRCA (Antonio). L'applicazione della sinforeazione all'indagine dello stato di alcuni organi della malaria nell'età infantile.—*Pediatrics.* 1928. Feb. 1. Vol. 36. No. 3. pp. 135-142. [19 refs.] [Inst. of Clin. Pediatrics, R. Univ., Sassari.]

WERNER (H.). Zur Fieberbehandlung der Paralyse (Malaria- und Quintanaimpfung).—*Abhandl. a. d. Gebiet d. Auslandskunde. Hamburg. Univ.* 1927. Vol. 26. (D., Med. & Vet. Vol. 2.) [Festschrift NOCHT.] pp. 590-593. [1 ref.]

HISTORICAL (CORRESPONDENCE).

WINTER (Francis A.). **The Romantic Side of the Conquest of Yellow Fever.**—*Milit. Surgeon*. 1927. Oct. Vol. 61. No. 4. pp. 438-452.

"On page 172 of the *Bulletin* for March, 1928, is a review signed by J. F. C. H. on an article by WINTER on yellow fever. In this article the reviewer asks two questions in next to the last paragraph. Why did the disease disappear (from British Guiana)? Why did it not disappear from Cuba?

"The full answer to these questions will be found in an article by Surgeon-General Henry Rose Carter, published in the *Transactions of the Society of Tropical Medicine and Hygiene*, June, 1917, volume 10, No. 7. Although it is almost eleven years since the publication of this article, everything that has been found in yellow fever campaigns and yellow fever studies has confirmed the truth of the statements made by Dr. Carter in this article. The discussion is interesting after this long interval. The doubts expressed in the discussion have not been justified by what has happened in the interval. Those of us who have been close to the yellow fever work feel that the paper of Dr. Carter gives an adequate answer to the questions of the reviewer.

"In the last paragraph the reviewer makes a statement that, 'the conquest of yellow fever can never be complete until the causal organism has been identified with certainty.' A little study of the disappearance of yellow fever from North America, and its almost complete disappearance from South America, would seem to throw great doubt upon the value of this statement. On the other hand, experience has shown everywhere where it has been tried on an adequate scale, and under suitable supervision, that yellow fever can be eradicated by control of the vector, and that knowledge as to the causal organism is merely of academic interest."

H. H. Russell.

Director of the International Health
Division, The Rockefeller
Foundation, New York.

April 26, 1928.

Dr. Russell says that the questions at issue were fully answered by CARTER. CARTER himself, in the paper referred to, said on this very point: "the explanation given above is believed to be true . . . Yet it is but a deduction from a fact and not the fact itself;" a statement as true to-day as it was eleven years ago. CARTER admitted that his explanation "depends absolutely on the doctrine that an attack of yellow fever confers immunity against another attack." He should have added that it assumes the truth of another unestablished "doctrine" namely that all who reach adult life in a yellow fever endemic area, are not only immune to the disease, but cannot harbour the causal organism and that they attain this condition whether they apparently contract the disease or not. This point was made by JAMES in the discussion following CARTER'S paper and, so far as I am aware, has never been disposed of.

In writing that the conquest of yellow fever will never be completed until the causal organism has been discovered I had in mind completion of the search for knowledge upon which REED and his co-workers embarked rather than the more limited conception of disappearance of the disease. I cannot think, however, that these writers would have regarded their task as complete so soon as they had placed an effective tool in the sanitarian's hand, or that they would have shared Dr. Russell's view that "knowledge as to the causal organism is merely of academic interest."

Such knowledge and more is vital for the establishment of CARTER'S views as something better than a doctrine. On the side of practical

prevention, NOGUCHI in 1922 (*Lancet*, 1922, Vol. 1, p. 1185) and others down to SELLARDS in 1928 (*Bull. Soc. Path. Exot.*, 1928, Vol. 21, No. 1 p. 70) have pointed to the value which, under conditions not favourable to attack on the vector, would attach to the possession of a prophylactic vaccine. Recently too (*Bull. Acad. Méd.*, Paris, 1927, Nov. 22, Year 91, 3rd ser., v. 98, No. 38, p. 434) the French Colonial Secretary addressed to the Academy of Medicine an official enquiry as to the value or otherwise of NOGUCHI's icteroides vaccine. The answer was no credit to the profession of medicine. The results of recent research on the aetiology of yellow fever are of course inconvenient and disturbing to those who have publicly proclaimed their confidence in the specific efficacy of *Leptospira icteroides* vaccines and sera, but there is no escape from the dilemma by writing it off as "merely of academic interest."

Already since the publication of WINTER's paper, there is accumulating material for a further chapter of the romance of the conquest of yellow fever; let us hope that chapter may record the completion of the conquest.

J. F. C. H.

MACARTHUR. **Old-Time Typhus in Britain.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1927. Apr. 27. Vol. 20. No. 8. pp. 487–503. With 2 figs. on plates. Also in *Jl. Roy. Army Med. Corps.* 1927. June. Vol. 48. No. 6. pp. 401–418 With 2 text figs.

"In his graceful and, otherwise, most laudatory review of my address on Old-time Typhus (ante, p. 180), Colonel Alcock makes some criticisms which I feel cannot pass unchallenged lest my late audience should condemn me as a purblind and irresponsible guide.

"I was quite aware that in Shakespeare's day the word 'ague' usually stood for malaria; my point was that, in addition, its original meaning of fever (including typhus) still persisted, and that the word appears in this sense in *Macbeth*. The ancient signification of 'ague' survived in England even beyond Shakespeare's time, for John Chamberlain writing of the typhus epidemic of 1623, calls it indifferently 'the spotted fever' and 'the spotted ague.' So as to refute my assertion regarding the original meaning of the word, Colonel Alcock cites Bede's *Ecclesiastical History*, where, he says, 'ague' is applied to a malady shown by the description to have been malaria. I agree with this identification of the ailment, but the word 'ague' does not occur in the original text. Bede's actual words are: '*puerulus quidam longo februm incommodo graviter vexatus*,' etc. The Anglo-Saxon version has: '*in longre lencenenadle hefiglice swenced*,' etc. 'Ague' is found only in the modern English translations of the *Ecclesiastical History* where, naturally, the word is used in its present-day sense; both the Latin and Anglo-Saxon texts were translated into English by the same scholar, and so, no doubt, '*lencenenadl*'* in one text suggested 'ague' as an appropriate term for '*febris*' in the other.

"Colonel ALCOCK also takes me to task for rendering *drif* (*Anglo-Saxon Chronicle*, 1087) by 'fever,' and quotes Ingram's English version of the *Chronicle*, published over a century ago, where *drif* is translated 'diarrhoea.' I do not know what reasons Ingram may have had for this belief which is rejected by more recent translators, e.g., Thorpe in the official *Chronicles and Memorials* series. Further, neither Bosworth nor Clark Hall accepts Ingram's interpretation, and in their dictionaries both define *drif* as 'fever,' the former citing this very passage from the *A.S. Chronicle* as an example of the use of the word. But infinitely more weighty than the opinion of any number of modern scholars is the silent

* It is interesting that King Alfred (the translator of Bede's Latin text into Anglo-Saxon) was so familiar with malaria as to recognize the disease from Bede's description, and render *febris*, not by an exact Anglo-Saxon equivalent, but by *lencenenadl*, Spring (Lent) ill, that is, malaria.

testimony of the Rushworth Codex. This is an ancient Latin M.S. of the Gospels wherein some old English scribe interlineated a word-for-word Anglo-Saxon translation. Here in more than one instance 'febris' is glossed by 'drif,' but one example will suffice. The first sentence of Matt. VIII, 15, runs *Et tetigit manum ejus et dimisit eam febris.* This seems to leave no doubt what *drif* meant to those who spoke this 'language that has long gone by.' "

W. P. MacArthur.

In reviewing Colonel MACARTHUR's paper on Old Time Typhus in Britain I dissented (1) from the argument that the word "ague" in its olden usage must be interpreted as the equivalent of the Greek word "synochus"—*σύνυχος* being, according to Liddell and Scott, a *restrictive* term for *unintermittent* fevers, originated by Galen; and (2) from the assumption that all the unspecified pestilences definitely associated with the famines of early periods of English history were typhus; and I supported my criticism by what, as I then supposed, were two interesting and easily verifiable references to the earliest of all English historical documents—namely, the Venerable Bede's *Ecclesiastical History of the English Nation*, and *The Anglo-Saxon Chronicle*—where, in the one case, an account of an intermittent fever is called "ague," and, in the other case, a particular famine-bred pestilence is called "diarrhoea." I know the two ancient documents only in their modern English versions, and it is from the well known "Everyman" editions that my quotations were taken. Colonel MACARTHUR, however, has shown from his knowledge of original texts that in the one instance (ague) the translation in question, although justifiable, is not verbally correct, and that in the other instance (diarrhoea) the translation in question is generally contradicted. I must, therefore, while reserving my freedom in the larger precincts of opinion, withdraw my untrustworthy witnesses from the court, and apologize for having introduced them without examining their credentials.

A. Alcock.

† "Sio" = *seó*, i.e., "the"

REVIEWS AND NOTICES.

KNOWLES (Robert) [Major, Indian Medical Service, Professor of Protozoology, Calcutta School of Tropical Medicine] & SENIOR-WHITE (Ronald) [Malaria Research Officer, Central Malaria Bureau Govt. of India.] **Malaria. Its Investigation and Control with Special Reference to Indian Conditions.**—pp. vi. + 220. With 42 figs. & 6 plates (5 coloured) & 29 figs. in Appendices II & III. 1927. Calcutta : Thacker, Spink & Co. [Rs. 7-8.]

This book is intended to meet the malaria problems of men of the Assistant-Surgeon class and this it does well. A clear description is given of the three species of *Plasmodium* which parasitize man, illustrated by three coloured plates. A striking incident shows the frequency of mixed infections, a neglected point which has led to tragedy when inadequate care has been taken to exclude the subtertian parasite from malarial blood which is to be used for the therapeutic infection of general paralytics. The share which this line of treatment has had in establishing the specific differences between the three ordinary species of plasmodia is brought out. Mention too is made of exceptional forms : of *P. ovale*, a synonym, if it be a valid species, of *P. minutum*,* and of *P. tenue*, of whose right to a separate specific existence Knowles is unconvinced.

A short survey is given of Ronald Ross's malarial work onwards from 1895, when, as a military medical officer keen on research he must have appeared to his regimental fellows of those days as a "somewhat unpleasant phenomenon." An apt diagram illustrates the interlinked human and anopheline cycles. The reasons against "parthenogenesis" are put clearly and reasonably, but unhappily all are not open to reason. On the question of malaria toxins different pages do not necessarily speak with the same voice. The plasmodia of animals other than man are illustrated after WENYON, to whom here and elsewhere full acknowledgment is given. The chapter on practical work is valuable, and pleasurable, too, if you can manage to skip the three consecutive lines with their two split infinitives. It is in every sense practical, deals among other matters with the preparation and examination of films, describes the normal and abnormal blood cells and depicts them in a coloured plate.

In treatment, SINTON's method is advocated for oral administration. Intramuscular quinine receives complete lack of sympathy, and the pertinent question is virtually asked—"If you must use a needle, why not put it into a vein?" There is much else of a practical nature here, such as the determining of the strength of the hospital stock quinine mixture which the compounder is so curiously apt to make up considerably under proof.

Senior-White's equally practical hygiene chapters follow. He notes for example that an epidemic of malaria is invariably associated with an increase in deaths from bowel complaints, yet CHRISTOPHERS has shown that the percentage of error is constant, so that the village chowkidar's statistics really are valuable after all in mortality registration. They are to be checked by hospital records, and by spleen and parasite indices. CHRISTOPHERS's abdominal charts for measuring splenic enlargement are described; as well as MCKENDRICK's mathematical differentiation of relapse from reinfection, for the comprehension of which, however, "very high mathematical acquirements are required." Determination of the dominant species of malaria parasite and of the distribution of anophelines need a year's observation, and, when the peccant species have been determined, species control is urged. That

* See WENYON's "Protozoology," (1926), vol. 2, p. 949.

introduces the question of breeding-place deviation, and the control of maddeningly arising see pages after completion of a surface drainage scheme.

Appendices deal with the breeding-places and distribution of Indian anopheles and supply keys to their adult and "mature" larval forms; and so we come back full circle to the beginning of the book and surely lay bare twin hidden domestic tragedies: "Dedicated with respectful homage to the wives of research workers (in recognition of their sufferings in the cause of science)."

Clayton Lane.

ASSOCIATION OF MEDICAL OFFICERS OF MISSIONARY SOCIETIES.

Health Instructions for Missionaries in the Tropics. With a Section on Emergency Treatment and a Supplement for Women Missionaries. Fourth Edition.—32 pp. With 3 figs. 1928. London: Hon. Sec., 1, Farnley Road, E. 4. [4d.; 3s. per doz.]

There is nothing novel about this little book, but it contains much sound advice for missionaries. If its rules are followed much avoidable sickness in the tropics will be escaped. There is sensible emphasis on the need for holidays away from tropical climate and the round of missionary work; one hopes that this advice, as well as being addressed to the missionaries themselves, has been pressed upon the authorities of missionary societies.

For diarrhoea the main part of the booklet recommends half an ounce to an ounce of castor oil; in the section for women missionaries Dame Mary SCHARLIEB advises a teaspoonful!

Protective inoculation against enteric infection is recommended for infants as soon as they begin to crawl, an obviously rational thing where such diseases are endemic; it has sometimes (unnecessarily) been thought that the vaccination must be delayed until the child reaches 7 years of age. It must be remembered, however, that there is experimental evidence that it is less easy, by means of vaccines, to produce immunity in the very young than in adults.

A useful list of helpful books is given and an ABC of health.

J. F. C. H.

Documents cliniques sur le stovarsol 1922-1927. [**Scientific Papers on Stovarsol 1922-27.**]—pp. xii + 318. Paris: Les Etablissements Poulenc Frères, 86-92, Rue Vieille-du-Temple.

This is a useful work in that it contains within one cover a large number of articles relating to the use of stovarsol. EHRLICH concluded from his researches that trivalent arsenic alone was active against protozoa. FOURNEAU later showed that this was not the case; pentavalent compounds were equally active and, moreover, were less toxic than trivalent. Stovarsol is pentavalent and has also the merit that it can be taken by the mouth. The present work contains, chiefly in abstract, 11 papers on the use of stovarsol in syphilis, 9 in yaws, 2 in relapsing fever, 4 in intestinal protozoal affections, 18 in amoebiasis, 4 in lamblasis, 3 in associated "parasitoses," 2 in intestinal spirochaetoses, 6 in fuso-spirillary associations, 7 in malaria, 2 in trypanosomiasis; from which it is evident that the drug is not narrowly specific, but has a wide range of action. Many of these papers have been noticed in the *Bulletin*. The list of references, from 1921 onwards, occupies 24 pages.

A. G. B.

BUREAU OF HYGIENE AND TROPICAL DISEASES.

TROPICAL DISEASES
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Vol. 25.]

1928.

[No. 8

RELAPSING FEVER AND OTHER SPIROCHAETOSSES.

MARZINOWSKY (E.). Ueber das Zecken-Rückfallfieber. [Tick Fever.] —*Abhandl. a. d. Gebiet d. Auslandskunde. Hamburg. Univ.* 1927. Vol. 26. (D., Med. & Vet. Vol 2.) [Festschrift NOCHT.] pp. 314–318. With 4 text figs. [6 refs.] [Trop. Inst., Moscow.]

A description of Persian relapsing fever, which has been observed not only in Persia, but also in Transcaucasia and Turkestan. The disease is transmitted by *Ornithodoros tholosani* and possibly by a second species allied to *O. lahorensis*. Particulars are given of two Russian investigators who experimentally infected themselves with this disease by the bites of *O. tholosani*. One of them had recovered from an attack of *S. recurrentis* five years previously.

The author gives a table indicating the differences between European and Persian relapsing fever.

	European Relapsing Fever.	Persian Relapsing Fever.
Incubation	7–8 days.	5–6 days.
Duration of attacks	3–5 days.	1–2 days.
Number of attacks	3–5 days.	5–7 (and more).
Spleen	Enlarged, easily palpable.	Very hard and not always palpable.
Muscle pains	Present.	Present.
Type of disease	Severe, may be fatal.	Slight generally without any mortality.
Spirochaetes	Present in considerable numbers.	Rare, usually only found in thick films.

The respective spirochaetes also differ in their dimensions, the index of *S. recurrentis* being 2.84 (de Mello's method) or 2.8773 (Delamare's method), as compared with 3.4 and 1.861 in the case of *S. persica*.

Finally, the author remarks that this disease was probably introduced from Africa during the slave traffic and has become established locally in ticks belonging to the genus *Ornithodoros*.

E. Hindle.

PAMPANA (Emilio J.). Notes on Colombian Relapsing Fever.—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1928. Jan. 31. Vol. 21. No. 4. pp. 315–328. With 3 charts in text. [11 refs.]

An account of Colombian relapsing fever (*S. neotropicalis*) based on the study of ninety-one cases occurring in the province of Chocó, where the disease is endemic. The infection is transmitted by *Ornithodoros*

talaje which are often found in great numbers in native huts; and in view of the habits of these ticks, closely resembling those of bed-bugs, the disease is generally restricted to particular houses or other localities where people may sleep, such as ship's cabins.

In its main characters the disease closely resembles other varieties of relapsing fever. No lasting immunity seems to be conferred by an attack, as undoubted cases of reinfection were observed, yet many of the natives seem to be completely immune. In untreated cases the number of febrile attacks is usually three, but four have been observed. The first attack has an average duration of 64 hours; the first relapse occurs after about ten days interval and generally lasts for 40 hours; the succeeding relapses are at shorter intervals and for shorter periods.

The spirochaetes are nearly always very scanty in the peripheral blood and it is advisable to use thick films for diagnosis. In two cases the organisms were observed after the crisis, when the temperature was normal.

Neosalvarsan in doses of 0.45 gm. was found to be an effective cure and to prevent relapses.

E. H.

BEVERIDGE (G. E. G.). **The Louse-Borne Type of Relapsing Fever as Prevalent in the Anglo-Egyptian Sudan, 1926 and 1927.**—*Med. Jl. Australia*. 1928. Jan. 28. 15th Year. Vol. 1. No. 4. pp. 110-112.

The author considers the probable origin of this type of relapsing fever was from the black troops returning to French West Africa after the War in 1921. The disease has spread through British and French West Africa, reaching Wadai in 1926, and thence into Darfur. The number of deaths in the Sudan is estimated as at least 200,000 and, possibly as a result of its recent introduction, the mortality in untreated cases is between 60 and 80 per cent. As a rule only one relapse was observed, from the tenth to the eighteenth day, but a second relapse occurred between the 30th and 32nd days in a number of patients. The clinical features of the disease are described, and apart from their severity are fairly typical.

The author's main object was to prevent the disease spreading further east and to suppress the local outbreaks. The first was effected by posting quarantine stations on the main roads, and insisting on the delousing of all travellers, and their clothes; movement from infected to non-infected areas was forbidden. Local outbreaks were suppressed by general delousing measures, and by isolating the patients; these were treated with novarsenobillon in doses of 0.45 gm. intravenously for adults, and 0.3 intramuscularly for children. This treatment should be given preferably during the pyrexial period, and its use reduced the mortality to 7 per cent. The deaths nearly all occurred amongst old people weakened by long illness.

E. H.

NICOLLE (Charles) & ANDERSON (Charles). Sur la présence au Maroc du spirochète de la fièvre récurrente espagnole. [**The Presence in Morocco of the Spirochaete of Spanish Relapsing Fever.**]—*C. R. Acad. Sci.* 1928. Apr. 11. Vol. 186. No. 15. pp. 991-992.

The presence of Spanish relapsing fever has not been recorded previously from Morocco, but from a batch of *Ornithodoros maroccanus*

obtained from Casablanca, the authors were able to infect experimental animals. By means of cross immunity experiments this strain of spirochaetes was found to be distinct from *S. duttoni*, *S. crociduræ* and *S. normandi*, respectively, but almost identical with the Spanish strain of the disease. The ticks which produced the infection came from the earth in the neighbourhood of a pig farm which had been abandoned about six years previously because of the large numbers of these acari, which normally feed on pigs.

The authors consider it infinitely more probable that the infected ticks had acquired the infection from some rodent or insectivorous animal, which may serve as a reservoir, than by the infection being transmitted hereditarily in the tick.

[Considering that *Ornithodoros moubata* infected with *S. duttoni* can transmit the infection hereditarily for longer periods than six years, without any infective feeds, it seems to the reviewer that such an explanation is more probable in the case described above than the theory of rodent or insectivorous reservoirs of the infection.]

E. H.

MATHIS (C.). Réceptivité des animaux de laboratoire vis-à-vis du spirochète récurrent humain de Dakar. [**Susceptibility of Laboratory Animals to the Relapsing Fever Spirochaete of Dakar.**]—*Bull. Soc. Path. Exot.* 1927. Oct. 12. Vol. 20. No. 8. pp. 826-829. [1 ref.] [Pasteur Inst., Dakar.]

A continuation of the author's observations on strains of relapsing fever obtained at Dakar [*ante*, p. 87]. Five strains were used and inoculated into monkeys, rabbits and wild mice, all of which were susceptible, and into cats, which were refractory. In mice, the spirochaetes generally appear in the blood 24 to 36 hours after inoculation, and after persisting until the fourth or fifth day gradually disappear without showing any distinct relapse, but the blood may remain infective until the 47th day. As usual, attacks confer immunity.

E. H.

MATHIS (C.). Immunité conférée à la souris grise par diverses souches de virus récurrent humain isolées à Dakar. [**Immunity conferred on Grey Mouse by Different Strains of R.F. at Dakar.**]—*Bull. Soc. Path. Exot.* 1927. Dec. 14. Vol. 20. No. 10. pp. 1038-1041. [Pasteur Inst., Dakar, Senegal.]

Cross-immunity experiments made with the Dakar relapsing fever spirochaete from five different sources, support the view that they all belong to the same variety.

E. H.

MATHIS (Constant). Identité du spirochète de la musaraigne et du spirochète humain dakarois. [**Identity of Spirochaetes of Shrew and Man in Dakar.**]—*C.R. Acad. Sci.* 1928. Jan. 3. Vol. 186. No. 1. pp. 46-48. [1 ref.]

By means of cross immunity experiments the author shows that the spirochaete [*S. crociduræ*] occurring in shrew mice at Dakar is identical with that found in human relapsing fever from the same locality; so presumably these animals may serve as a reservoir for

the disease. The manner in which the disease is communicated to man is unknown and *Ornithodoros* has not yet been found at Dakar, but by searching the burrows of shrew mice the author has succeeded in finding the nymphs of an undetermined species of tick which may be concerned in the transmission.

E. H.

MATHIS (C.). Transmission expérimentale du spirochète de la musaraigne par le pou. [**Experimental Transmission of the Shrew Spirochaete by the Louse.**—*C.R. Acad. Sci.* 1928. Jan. 16. Vol. 186. No. 3. pp. 177-179.]

— Transmission expérimentale au singe du spirochète de la musaraigne, par le pou.—*Bull. Soc. Path. Exot.* 1928. Feb. 8. Vol. 21. No. 2. pp. 173-177. With 1 text fig. [3 refs.] [Pasteur Inst., Dakar.]

The author has tried to discover how *Spirochaeta crociduræ* is transmitted from the shrew mouse to man, but hitherto has failed to find any intermediate host which might be the agent.

The disease has been transmitted from monkey (*Cercopithecus patas*) to monkey by means of lice, and details are given of these experiments. Lice were fed on a monkey whose blood contained these spirochaetes and subsequently on a second monkey for eight days, but this animal remained uninfected. The contents of these lice were negative to microscopic examination and when inoculated into a third monkey produced no signs of disease, but blood taken from this animal and inoculated into six mice produced a very slight infection in two of them.

E. H.

LAGRANGE (E.). Les formes pulmonaires de la fièvre récurrente. [**Pulmonary Forms of Relapsing Fever.**—*Bull. Soc. Path. Exot.* 1927. Oct. 12. Vol. 20. No. 8. pp. 716-718. [2 refs.] [Bact. Lab., Quarantine Council for Egypt, Alexandria.]

GIRARD's account of the association of pneumococcus with the plague bacillus in cases of pneumonic plague [*ante*, p. 317] has led the author to describe the symptoms of an outbreak of tick fever [*S. duttoni*] among the Belgian native troops during 1915 in the neighbourhood of Lake Tanganyika.

In the plains the disease showed the usual symptoms, but when the troops advanced into the high plateau of Kitega, the fever changed its character and many of the patients suffered from broncho-pneumonia during the febrile attacks; moreover, the mortality was greatly increased. When the troops again descended to the plains the pulmonary symptoms disappeared and the disease once more resumed its usual manifestations.

E. H.

GORI (Pio). Ricerche sperimentali con la *Spirochaeta recurrentis* (Dutton). [**Experiments with *S. recurrentis*.**—*Bol. Istituto Sieroterap. Milanese.* 1928. Jan. Vo. 7. No. 1. pp. 1-14. German summary pp. 9-10. [14 refs.]

An account of interesting experiments showing that the strains of spirochaetes of the original attack, and also of each successive relapse possess distinct immunity reactions.

A mouse was infected with a strain of *Spirochaeta duttoni* and sub-inoculations made into other mice with spirochaetes of the original attack and of each succeeding relapse, respectively. Mice that recovered from the resulting infections were subsequently reinoculated with spirochaetes of the first attack or of the relapses, and it was found that they were completely immunized against the type of spirochaete that caused the original infection in each case, but only partially immunized against spirochaetes from other stages in the disease.

Thus a mouse that had originally been infected by the inoculation of second relapse spirochaetes could not be reinfected by a subsequent inoculation of other second relapse spirochaetes, but showed infections of varying severity if inoculated with organisms of the first attack, or any of the other relapses. Similarly a mouse inoculated with organisms from the original attack was immune against the same type, but could be reinfected by the inoculation of spirochaetes taken at any of the relapses. The author explains these results by assuming that the spirochaetes acquire new immunological properties after each relapse. Tables are given showing the results of numerous experiments on the cross immunity of the various strains.

E. H.

BRUSSIN (A. M.) & ROGOWA (G. J.). Zur Frage der Pathogenese der Rezidive beim experimentellen Rückfallfieber. [**The Pathology of Relapses in Experimental Relapsing Fever.**].—*Cent. f. Bakt.* I. Abt. Orig. 1927. Dec. 20. Vol. 105. No. 1-3. pp. 39-54. [17 refs.] [Microb. Inst., Education Commissariat, R.S.F.S.R. Moscow.]

Employing the adhesion or thrombocytobarin test [*ante*, p. 106] for the identification of the spirochaetes in successive febrile attacks of animals infected with *S. duttoni* and *S. recurrentis* respectively, the authors are able to show very clearly the serological differences between the spirochaetes of the first attack and those of the second attack (or first relapse). After the second attack the capacity of developing antibodies seems to be lost in the great majority of cases.

Spirochaetes of the third attack of a mouse infected with *S. duttoni*, when exposed to the action of serum containing first attack antibodies, gave eight negative and two positive reactions; but when the serum contained antibodies against both first and second attack spirochaetes, fifteen positive and six negative reactions were obtained.

Spirochaetes of the fourth attack gave similar results, being negative to first attack serum, but giving positive reactions with serum containing antibodies against first and second attack spirochaetes, or against first, second and third attack spirochaetes, or even with serum containing only third attack antibodies.

Experiments with the organisms from the brain of clinically recovered animals showed that some of the spirochaetes gave a slight reaction with first attack serum and some with second attack serum, but all of them gave well marked positive reactions with serum containing antibodies against both these races.

When mice were inoculated respectively with spirochaetes of the second, third, and fourth attacks, the spirochaetes of the first attack were serologically distinct from those inoculated, but the organisms of the first relapse were identical.

[These experiments are in continuation of those of BRUSSIN (this *Bulletin*, Vol. 23, p. 113) and should be compared with CUNNINGHAM's observations (*loc. cit.* p. 112)].

E. H.

BRUSSIN (A. M.) & SCHAPIRO (S. L.). Zur Frage der genetischen Beziehungen zwischen den Spirochäten vom Typus Rekurrens. [**The Genetic Relationship of Relapsing Fever Spirochaetes.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1928. Jan. Vol. 32. No. 1. pp. 13-24. [5 refs.]

Employing the adhesion test [sometimes known as RIECKENBERG's test, see this *Bulletin*, Vol. 24, pp. 968-70] the authors have tested the relationships of five strains of *Spirochaeta duttoni*, and two of *S. recurrentis*, with the rather curious result that six of the strains gave similar reactions, whilst a strain of *S. duttoni* from Brazzaville (Congo) seemed to be entirely distinct. This strain, however, had been kept going a much shorter time in the laboratory than the others, and the authors consider that ultimately it will probably agree with the others in its reactions. In support of this view a fresh strain of *S. recurrentis* from the haemolymph of an infected bug also gave reactions different from those of the laboratory strain.

As a result of the adhesion tests and also cross inoculation experiments, the authors consider that *S. recurrentis* and *S. duttoni* are merely varieties of one species which have acquired different characters under the influence of varying climatic conditions and adaptation to transmission by different hosts. When, however, these various strains are kept in the laboratory, under the same conditions and in the same host, they gradually lose these properties and cannot be distinguished by their immunity reactions.

E. H.

HERONIMUS (E. S.). Beiträge zur Kenntnis der Immunität bei Rekurrens. [**A Study of Immunity in Relapsing Fever.**]—*Cent. f. Bakt.* I. Abt. Orig. 1928. Feb. 15. Vol. 105. No. 6-8. pp. 394-402. [9 refs.] [Microb. Research Inst., Education Commissariat R.S.F.S.R., & Bact. Inst., Ind. State Univ. Moscow.]

The author has investigated the question of immunity in mice infected with a Berlin strain of *S. duttoni*, with special reference to the significance of the brain infection.

By reinoculating mice that had recovered from an attack 5 or 6 weeks previously, it was found that when 7 drops of heavily infected blood were used, 23 out of 25 animals showed a reinfection; with 3 drops, 16 out of 18; but with 2 drops, only 5 out of 17.

The author explains these results by assuming that the "humoral" immunity is very slight and labile, and insufficient to cope with the influx of a large number of spirochaetes. Examination of the brains of these reinfected mice showed that 58.3 per cent. contained spirochaetes, whereas after a single infection KRITSCHESKI [*ante*, p. 93] with the same strain found only 39.6 per cent. of the brains positive. It seems, therefore, that a reinfection increases the chance of the brain becoming infected.

Immunity in relapsing fever is considered to depend mainly on the persistence of the brain infection, and secondarily on the relatively weak "humoral" immunity of the blood, and other body fluids.

E. H.

SAGEL (W.). Beobachtungen ueber das Verhalten der Immunität bei mit Rückfallfieber künstlich infizierten Paralytikern. [**Notes on the Retention of Immunity in Cases of Paralysis infected with Relapsing Fever.**—*Arch. f. Schiffs- u. Trop.-Hyg.* 1928. Apr. Vol. 32. No. 4. pp. 178–187. With 3 charts in text.]

A number of observations on the immunity in relapsing fever, made in the course of treating more than 200 patients suffering from paralysis, with either *S. duttoni* or a Moroccan strain of spirochaetes.

In human patients recovered from *S. duttoni* infection, immunity against homologous strains was still present after 5½ years, but none against the Moroccan strain. Prolonged passage of the strain of *S. duttoni* in mice caused a considerable diminution of the virulence towards human beings, and therefore it was found best to pass the strain through a human host after 30 to 40 passages through animals.

Convalescent serum was only of use against the homologous strain, and had to be used in very large doses to be of any use.

When patients immune against *S. duttoni* were reinjected with the same strain, there was no increase in the strength of the immunity when the serum was tested a month after the last injection. If tested after only two weeks had elapsed an increase in strength was observed, but this is evidently only transitory.

E. H.

PLAUT (F.). Ueber gelungene Reinfektionen mit Impfrekurrens und ueber die Ursachen der Rekurrensimmunität beim Menschen. [**Re-Infection with Relapsing Fever and the Immunity Question.**—*Deut. Med. Woch.* 1928. Mar. 16. Vol. 54. No. 11. pp. 424–426. [10 refs.] [German Psychiat. Research Inst. ("Kaiser Wilhelm" Inst.) Munich.]

Although as a general rule recovery from relapsing fever seems to be followed by immunity [see above] the author has succeeded in two cases in reinfecting patients, one after an interval of five years and the other after eight years. [The original infections, however, had been treated by injections of salvarsan and mercury in one case, and neosalvarsan and sulphoxalate in the other, which may have interfered with the development of a complete immunity.]

Immunity against reinfection does not seem to depend on the presence of specific immune substances in the blood, for patients were found to be completely immune when reinoculated subcutaneously with spirochaetes, although no specific immune bodies could be found in their blood.

E. H.

MORETTI (P.). L'infezione sperimentale da *Spirocheta duttoni* nella terapia della leucemia e della poliartrite reumatica cronica. [**Experimental Infection with *S. duttoni* for the Treatment of Leukaemia and Rheumatoid Arthritis.**—*Riforma Med.* 1928. Jan. 2. Vol. 44. No. 1. pp. 2–7. With 3 charts. [16 refs.] [Inst. of Path. & Clin. Med. R. Univ., Messina.]

Details are given of one case of leukaemia and two of rheumatoid arthritis treated by infection with tick fever. The results were so

favourable that the author considers they justify its application on a larger scale and he gives reasons for preferring this infection to malaria. The strain is easily maintained in infected ticks, and moreover relapsing fever is a milder disease and its febrile attacks are wider spaced. Except in very exceptional cases it does not produce any complications, and it can easily be cured by stovarsol administered by mouth.

E. H.

MELENEY (Henry Edmund). **The Effect of Splenectomy on the Course of *Spirochaeta recurrentis* Infection in Squirrels.**—*Abhandl. a. d. Gebiet d. Auslandskunde. Hamburg. Univ.* 1927. Vol. 26. (D., Med. & Vet. Vol. 2.) [Festschrift NOCHT.] pp. 328-332. [4 refs.] [Peking Union Med. College, Peking.]

The author has studied the course of infection in the grey squirrel (*Sciurus vulgaris*) of *S. recurrentis* infections in North China. Normally this animal when inoculated intraperitoneally shows spirochaetes for one to five days after inoculation, but there is no systemic reaction and ordinarily no relapse occurs.

Twenty-five splenectomized squirrels were then inoculated and in these animals the intensity and duration of the initial attack were increased and this was followed by one or two relapses of varying intensity. The systemic effects were slight malaise, moderate anaemia, and often marked regenerate changes in the appearance of the red blood cells. Death occurs in a certain number, only when a relapse succeeds the first attack without any interval. It is evident, therefore, that the spleen prevents an excessive multiplication of the parasites and also affords protection against relapses.

It is of especial interest that splenectomy often causes the appearance in the blood of a species of *Babesia* and of a *Bartonella*-like organism, either of which may cause the death of the squirrel. Up to the present these organisms have not been observed in normal squirrels.

E. H.

PRIGGE (R.). & ROTHERMUNDT (M.). Experimentelle Untersuchungen über die Persistenz der Recurrensspirochäten im Gehirn der Mäuse. [**Experiments on the Persistence of Relapsing Fever Spirochaetes in the Brain of the Mouse.**]—*Ztschr. f. Hyg. u. Infektionskr.* 1928. Jan. 30. Vol. 108. No. 2. pp. 398-410. [9 refs.] [State Exper. Therapy Inst., & "Georg-Speyer" House, Frankfurt a.M.]

The marked difference between strains of spirochaetes that have been maintained in experimental animals for long periods, compared with those recently isolated from human cases of the disease, is well shown in the persistence of the spirochaetes in the brain. After inoculation with the latter type, practically every mouse showed a residual brain infection, whilst with the former, only three out of forty animals infected with various strains of spirochaetes, showed any persistence of these organisms in the brain.

The authors have investigated this problem, employing various strains of *S. duttoni* and *S. recurrentis*, and find that the difference is the result of variations in the amount of antibodies produced. The

"human" strains, recently isolated from human cases, produce only a slight immunity reaction and consequently there is not a sufficiently high concentration of immune bodies in the blood to kill the spirochaetes in the brain, where the circulation is comparatively feeble. Similarly when a chemotherapeutic agent is injected, parallel results are obtained, as the concentration of the drug may be sufficient to kill the organisms in other parts of the body but not in the brain. Experiments are given in support of the views advocated by the authors that the persistence of spirochaetes in the brain is merely a question of the degree of immunity developed by the host against the infection.

E. H.

PLAUT (F.). Untersuchungen ueber die Rolle der Milz für die Aufrechterhaltung der isolierten Gehirnspirochätose bei Recurrens-Ratten. [**Investigations on the Role of the Spleen in the Maintenance of Spirochaetes in the Brain of Rats infected with *S. recurrentis*.**—*Klin. Woch.* 1928. Feb. 12. Vol. 7. No. 7. pp. 301-303. [18 refs.]

Rats that had clinically recovered from infection with *S. recurrentis* were splenectomized after varying intervals, in order to see whether removal of the spleen had any effect on the spirochaetes in the brain. After the operation all the rats showed Bartonella anaemia, but splenectomy had no effect on the brain spirochaetes, which did not appear in the blood.

By subsequent inoculations it was proved that spirochaetes were still present in the brains of these animals, but not in any other part of the body. In the few instances where spirochaetes reappeared in the blood of splenectomized rats, the author brings evidence suggesting that these are cases of latent infection not located in the brain, and his general conclusions agree with the view that once established in the nervous system the spirochaetes cannot be induced to reappear in the blood by any known method. [but see this *Bulletin*, Vol. 25, pp. 88 and 92.]

E. H.

LEVADITI (C.) & ANDERSON (T. E.). Neurotropisme du *Spirochaeta duttoni*. [**Neurotropism of *S. duttoni*.**—*C.R. Acad. Sci.* 1928. Mar. 5. Vol. 186. No. 10. pp. 653-654. [7 refs.]

An article confirming BUSCHKE and KROO's discovery that spirochaetes may persist in the central nervous system long after these organisms have disappeared from other parts of the body. Working with a Brazzaville strain of *S. duttoni*, the authors found that the brains of mice that had recovered from the disease still contained the organisms in an invisible form, for although the infected nervous tissue was carefully examined, no trace of spirochaetes could be discovered. Nevertheless the virus was not filterable, from which the authors assume that it is intimately associated with the nerve cells. The organism in the nervous system is not resistant to immune bodies present in the blood; also it will produce infection in the blood when animals are inoculated intra-cerebrally.

E. H.

SCHAUDER (Hermann). Zur Frage der Spirochätenpersistenz im Zentralnervensystem und ihrer chemotherapeutischen Beeinflussbarkeit bei experimenteller Rekurrens. [**The Persistence of Relapsing Fever Spirochaetes in the Central Nervous System and the Effects of Chemotherapeutic Agents on them.**]—*Arch. f. Schiffshygiene. Trop.-Hyg.* 1928. Jan. Vol. 32. No. 1. pp. 1–13. [7 refs.]

Using a strain of *S. recurrentis* in rats and mice, the author gives details of experiments devised mainly to test the effect of various chemotherapeutic agents on the infection in the brain. By means of subinoculating from different parts of the central nervous system of a rat that had been infected more than 3 months previously and been negative to blood examination since the first attack, it was shown that the infection was still present in the cerebral hemispheres, cerebellum, optic tracts, and spinal cord of the animal. The spirochaetes seem to be more abundant in the deeper parts of the brain than at the surface, for inoculations of the outer layer of the brain were negative, possibly owing to the presence of more bloodvessels and consequently greater exposure to immune bodies of the blood.

Experiments were made on the effects on the spirochaetes in the brain of three compounds, neosalvarsan, Albert S 102, and another arsenical preparation, Böhringer 242. Albert S. 102 seemed slightly more efficacious than the other two, but even when the drug was administered at the beginning of the infection and caused the spirochaetes to disappear from the blood, in many cases the central nervous system was found to be infected; but when the initial treatment was continued for three to five injections at intervals of two or three days, the brain also was sterilized.

On the other hand, immune animals, in which the spirochaetes have become established in the brain, are rarely sterilized even by long continued injections. Consequently, in searching for a more efficacious therapeutic agent for the cure of spirochaetal infections, attention should be directed to the effect of the drug on the parasites in the brain, which prove so resistant to all known methods of treatment.

E. H.

JAHNEL (F.) & LUCKSCH (F.). Ueber das Vorkommen der *Spirochaeta Obermeieri* in der Hirnsubstanz des Menschen. [**The Occurrence of *S. obermeieri* in the Human Brain.**]—*Med. Klin.* 1927. Dec. 30. Vol. 23. No. 52 (1203). pp. 2003–2004. With 3 text figs. [3 refs.]

The authors made sections of the brains of two soldiers who died of relapsing fever during the War, and found spirochaetes [*S. recurrentis*] in both of them. One showed very few parasites whilst in the other they were abundant.

E. H.

STREMPER (Rudolf). Experimentelle Untersuchungen an subokzipital in den Liquor mit Rekurrens infizierten Kaninchen. [**Experimental Study of Rabbits infected with Relapsing Fever by Inoculation into the Cerebrospinal Fluid.**]—*Deut. Med. Woch.* 1928. Apr. 27. Vol. 54. No. 17. pp. 687–689. [11 refs.]

In contrast with the results usually obtained by intraperitoneal inoculation of relapsing fever spirochaetes into rabbits, when the

organisms are introduced directly into the cerebrospinal fluid, the percentage of animals showing a subsequent infection of the central nervous system is very high. Thus out of 16 rabbits infected in this manner, five contained spirochaetes in both the blood and cerebrospinal fluid; five in the latter alone; and one in the blood alone. Five were negative in both, but subsequent subinoculations of brain material into mice gave positive results in two cases. The infected rabbits could be cured by two injections of neo-silver-salvarsan and were then negative in the central nervous system. As might have been expected, rabbits infected in this manner developed the specific antibodies in the blood, as proved by mixing the serum of recovered animals with spirochaetes and inoculating the mixture into mice.

E. H.

BESCHKINA (R. I.). Das Ausmessen der Spirochäten. [**The Measurement of Spirochaetes.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1928. Jan. Vol. 32. No. 1. pp. 43-46. With 4 text figs.

The author compares de MELLO's index for measuring spirochaetes with DELAMARE's [spelt Delemare] method, in which the length and maximum height of the coils is taken into account. Three cases of Persian relapsing fever in their measurements all agreed with each other, but differed markedly from typical *Spirochaeta recurrentis*. Delamare's method was found to give better results and is recommended for the morphological differentiation of relapsing fever spirochaetes.

E. H.

BRUYNOGHE (R.). **A Contribution to the Study of Relapsing Fever.**—*Jl. State Med.* 1928. Jan. Vol. 36. No. 1. pp. 3-20. [37 refs.]

A useful summary of some of the recent work on relapsing fever with special reference to the biology of spirochaetes, including experiments made by the author, mainly with *S. duttoni*.

After testing various culture media the following modification of Ungermann and Galloway's methods was found to be the most satisfactory:

A small quantity (1 cc.) of egg yolk is placed in a narrow sterile tube and coagulated in a cup-shape by keeping the tube slanting, whilst rotating it in boiling water. Rabbit serum diluted to 1/6 with glucose Ringer solution (glucose 1 gm., Na Cl 9 gm., Ca Cl₂ 0.24 gm., NaHCO₃ 0.1 gm., water to 1,000 cc.) is then added, and the medium immediately covered with a layer of sterile liquid paraffin about 1 cm. deep and the tube then heated at 56°-58° C. for an hour. Before using the tube, a drop of sterile blood (man, rabbit, mouse,) is introduced, and the tube rotated in order to distribute the corpuscles evenly throughout the medium. A fibrinous reticulum is formed which afterwards contracts.

The addition of blood is unnecessary when it is intended to isolate spirochaetes from blood, as enough is introduced when seeding the culture tube. After being seeded the tubes are kept at 36° to 37° C. and two or three days cultivation is sufficient to show several spirochaetes in each microscopic field. The cultures grow until the eighth day and are especially rich at the bottom of the tubes. They remain alive for a fortnight but it is better to make subcultures every 7 days. The sugar is indispensable as spirochaetes seem to use it in their metabolism and the addition of either glucose or laevulose to the medium in which they are living produces increased motility.

The paraffin helps to keep the pH constant, as this should be in the neighbourhood of 7.4. The cultures retain their pathogenicity for some time, but after ten months *Sp. duttoni* became irregularly and weakly pathogenic for man and animals, although the cultures were as abundant as at the beginning.

This culture method is recommended for the diagnosis of mild cases of blood infection. Serological tests gave inconstant results [but there is no evidence that the author distinguishes the differences between spirochaetes of the first attack and those of the relapses].

Relapsing fever was found not to affect the results of the Bordet-Wassermann test provided the antigen was prepared according to the Bordet-Ruelens technique.

Attempts to vaccinate animals with killed cultures were unsuccessful and attenuated cultures also failed to produce immunization.

Relapsing fever produces a real immunity in both man and animals, due to the persistence of a latent infection either in the brain or some other internal organ. In mice that have recovered two or three months previously, an infection with *Spirillum minus* or trypanosomiasis will often produce the reappearance of spirochaetes.

The author's strains of spirochaetes were found to have very little sensibility to neosalvarsan, as doses relatively 5 to 20 times as strong as those used for man failed to sterilize mice infected with *S. duttoni*.

In human cases, however, its curative action is well known, but the suggestion is offered that arsenical compounds produce only an attenuation of the infection, so that its evolution becomes torpid and does not manifest itself by any symptoms.

E. H.

NICOLLE (Charles) & ANDERSON (Charles). De certaines règles à suivre dans l'expérimentation sur les spirochétoses sanguines. [**Rules to be observed in Experimentation with Blood Spirochaetes.**].—*Arch. Inst. Pasteur de Tunis*. 1927. Dec. Vol. 16. No. 4. pp. 333-346.

An account of technical details recommended by the authors for the use of those working with strains of relapsing fever.

In the first place it is very important to avoid the possibility of introducing a new virus, as blood spirochaetes are widespread in nature. Consequently, wild animals should always be regarded with suspicion as possible sources of contamination, and domestic animals, such as white mice and rats, should invariably be used for the maintenance of strains. The possibility of the laboratory animals becoming infected by means of ticks or other intermediaries should also be borne in mind, and care taken to avoid any such contamination.

In view of the fact that animals may remain infected with spirochaetes long after they have apparently recovered, the authors recommend that after being used for the passage of any strain an animal should be destroyed, unless it is required for experiments on immunity and the like.

The authors maintained five strains of relapsing fever at Tunis, viz.: Tick fever and the Dakar Strain [*S. crociduræ* from the shrew-mouse] which the authors consider identical; both these are easily maintained in mice and white rats: Spanish relapsing fever, for which the guineapig is the most suitable host; the spirochaete of a desert gerbille, *Meriones shawi*, transmitted by *Ornithodoros normandi*,

which can be maintained in white mice : and finally European relapsing fever, the most difficult of all to maintain in the laboratory owing to its feeble pathogenicity, for which the alternation of white mice and monkeys is recommended. The best method of inoculation is merely to introduce a drop of infected blood into the eye, as the spirochaetes pass through the conjunctiva and produce an infection more closely approximating the normal than if one inoculates parasites intraperitoneally. This method is said to be quite as certain as any other, and succeeds when the spirochaetes are so rare in the medium as to be invisible by ordinary examination.

After insisting on the great importance of labelling and keeping complete records, the authors point out the necessity of care in handling the animals and infected material, in order to avoid the risk of laboratory infection, which is considerable in view of the fact that the virus is able to pass through any mucous surface, or the slightest abrasion. [The number of cases of laboratory infection with relapsing fever is well known, and workers will fully appreciate the necessity of these precautions.]

E. H.

MATHIS (C.). Au sujet des précautions à prendre dans l'étude expérimentale des virus récurrents. [**Methods adopted in the Experimental Study of Relapsing Fever Viruses.**].—*Bull. Soc. Path. Exot.* 1928. Feb. 8. Vol. 21. No. 2. pp. 179-182. [3 refs.] [Pasteur Inst., Dakar.]

Whilst agreeing in the main with NICOLLE and ANDERSON's suggestions (see above) the author considers that the ordinary wild grey mouse of Senegal is an exception to the general rule against employing wild animals for the maintenance of relapsing fever spirochaetes. This animal is said to be free from any natural infection and also has very few ectoparasites. The mice are kept in fairly tall glass bottles covered with a heavy lid and to facilitate examination a few ordinary wooden cases, such as are used for protecting tubes containing pathological specimens sent by post, are placed in each bottle. The mice take refuge in the cases, one in each, but the tail protrudes and consequently the animals can readily be picked up without any danger of them escaping or biting the operator. By holding the mouse by its tail and rotating it for a few seconds, it becomes dazed and can then be handled with ease.

The author employs a different colour for each of the strains maintained in the laboratory and this colour is applied not only to the label of the receptacles but also to some part of the body of each infected animal. By using different parts of the body it is easy to distinguish each individual when several mice inoculated with the same strain are kept together in the same cage.

E. H.

VAN NITSEN (R.). Le traitement de la fièvre récurrente Africaine par le stovarsol sodique. [**Treatment of African R.F. by Sodium Stovarsol.**].—*Ann. Soc. Belge de Méd. Trop.* 1927. Nov. Vol. 7. No. 2. pp. 177-180.

Intravenous injections of the sodium salt of stovarsol in doses of 0.5 to 1.5 gm. caused an immediate disappearance of the febrile

symptoms in patients suffering from tick fever. The usual method of treatment was to inject 0.5 gm. the first day, 1.0 gm. the second, 1.5 gm. the third, and this last dose was repeated every 48 hours; each patient received ten injections without showing any signs of intolerance. In order to effect a complete cure, doses amounting to at least 15 gm. were required and in view of the more favourable results recorded in other localities the author states that in their neighbourhood (Katanga) the disease seems to be particularly resistant to arsenicals.

E. H.

SCHOFIELD (A. T.). **Treatment of Spirillum Fever with Stovarsol.** [Memoranda.]—*Brit. Med. J.* 1927. Dec. 17. p. 1140.

An article advocating the use of stovarsol for the treatment of tick fever [*S. duttoni*], as it has the advantage of being taken by mouth and consequently can be entrusted to the ordinary intelligent native. Six tablets, each of 4 grains, swallowed whole, were administered for two successive days and found to cure all toxic symptoms and prevent relapses.

E. H.

KRITSCHIEWSKI (J. L.) & FRIEDE (K. A.) Weitere Untersuchungen der prophylaktischen Eigenschaften des Stovarsolans. [**Further Studies on the Prophylactic Value of Stovarsol.**]—*Arch. f. Dermat. u. Syph.* 1927. Dec. 27. Vol. 154. No. 1. pp. 178-186. [10 refs.] [Microb. Inst., Education Commissariat, R.S.F.S.R., Moscow.]

The authors have studied the prophylactic value of stovarsolan [a Russian preparation of stovarsol] in relapsing fever in rats and mice.

When rats were infected with *S. duttoni* and given stovarsol by mouth twice daily from the date of inoculation, out of 19 animals only one showed spirochaetes in the blood, but seven contained spirochaetes in the brain; the remaining 11 animals showed no signs of infection. On the other hand, 31 rats inoculated with *S. recurrentis* and similarly treated, all remained negative both to blood and brain examination. The strain of *S. duttoni* came from Berlin and is known to be arsenic-fast, whilst the *recurrentis* strain was from Frankfurt and is very susceptible to salvarsan.

Using the same two strains in mice, it was found that the effect of stovarsol in the case of *S. recurrentis* infections depended to some extent on the number of spirochaetes in the blood, for a dose which cured every mouse that showed one parasite in 50 fields of the microscope, failed to cure a single mouse when the blood contained numerous spirochaetes.

With reference to dosage, approximately double the amount of stovarsol was required to sterilize animals infected with the Berlin strain as compared with those infected with the Frankfurt strain.

A comparison was made between the prophylactic value of novarsolan [neosalvarsan] and stovarsol, both administered per os; although the former had slightly more effect on the spirochaetes, on the other hand it was very much more toxic.

The authors conclude that for spirochaetal infections stovarsol as a prophylactic agent, administered by mouth, surpasses all other known arsenical compounds.

E. H.

GAUJOUX (E.) & STODEL (G.). Action de l'acétylamino-oxyphénylarsinate de diéthylaminoéthanol sur le nagana de la souris et sur la fièvre récurrente de la souris (spirochète de Dutton). [**Action of A.-a.-o. of D.-e. on Nagana and Relapsing Fever in Mice.**]—*C.R. Soc. Biol.* 1927. Vol. 97. No. 36. pp. 1681-1683. [Gen. Physiol. Lab., Sorbonne & Clin. Labs., Paris.]

Acetyl-amino-oxyphenylarsinate of diethylamino ethanol was found to be a very efficient drug for the treatment of mice infected with *Trypanosoma brucei* or *Spirochaeta duttoni*. The compound was mixed with twenty times its volume of saline solution and the resulting liquid injected once daily for three to six days. The curative dose for nagana was 0.009 cc. to 0.011 cc. equivalent to 0.00045 to 0.00055 gm. of arsenic, and for spirochaetosis, 0.01 cc.

E. H.

ESQUIER (C. A.). Traitement de la fièvre récurrente par l'acétylarsan. [**Treatment of Relapsing Fever by Acetylarsan.**]—*Bull. Soc. Path. Exot.* 1928. Feb. 8. Vol. 21. No. 2. pp. 113-121. With 7 text figs. [3 refs.]

The author recommends the use of acetylarsan as more efficacious than 914 for the treatment of relapsing fever. The compound is supplied in sterile ampoules containing 3 cc. of the solution and six Algerians infected with the disease were each cured by a single subcutaneous injection of 2 cc., equivalent to a dose of 0.1 gm. of arsenic.

A French soldier, however, who suffered from the disease and received an injection at the height of the first relapse, showed a typical second relapse in spite of the treatment.

E. H.

WILLMORE (J. Graham). **A Case of Intermittent Pyrexia associated with and probably due to Broncho-Spirochaetosis, shown April 6, 1927.**—*Proc. Roy. Soc. Med.* 1928. Jan. Vol. 21. No. 3. pp. 474-476 (Sect. Trop. Dis. & Parasit. pp. 28-30).

Details are given of the clinical history, symptoms and treatment of a case which seems to agree with the descriptions of broncho-spirochaetosis. The clinical evidence showed that febrile attacks were invariably preceded by and associated with an exacerbation of the chest condition, and that each attack was associated with the expectoration of the typical pink, glairy mucus, containing numerous spirochaetes. In the apyrexial periods spirochaetes were either not found or were very rare.

The sputum of twenty cases of chronic and subacute bronchitis was examined as a control and spirochaetes were either absent or present in very small numbers.

E. H.

COLAS-BELCOUR (Jacques). Note sur *Ornithodoros Normandi*, ses caractères différentiels et sa biologie.—*Arch. Inst. Pasteur de Tunis.* 1928. Mar. Vol. 17. No. 1. pp. 35-39. With 4 figs. on 1 plate.

GRASSBERGER (Alfred). Beitrag zur Kenntnis des Vorkommens von Pseudospirochaeten im menschlichen Blut.—*Folia Haematologica.* 1928. Mar. Vol. 36. No. 1. pp. 17-24. [7 refs.] [Third Med. Clinic, Univ., Vienna.]

NICOLLE (Charles), ANDERSON (Charles) & COLAS-BELCOUR (Jacques). Sur un spirochète sanguicole nouveau (*Sp. Normandi*), transmis par un ornithodore (*Orn. Normandi*), hôte des terriers de rongeurs nord-africains.—*Arch. Inst. Pasteur de Tunis.* 1928. Mar. Vol. 17. No. 1. pp. 1-34. [7 refs.]

ONGKIEHONG (H. F.). Eenige gevallen van Broncho-spirochaetosis.—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1927. Vol. 67. No. 6. pp. 895-898. [Provincial Lab., Singarada, Dutch E. Indies.]

RATE-BITE FEVER.

MOOSER (H.). Etudes expérimentales sur le sodoku. [**Experiments on Rat Bite Fever.**—*Schweiz. Med. Woch.* 1927. Nov. 26. Vol. 57. No. 48. p. 1154.]

An interesting account of experiments with rat-bite fever in guineapigs which invariably succumbed to the infection, and rabbits, which soon recovered. After recovery the blood of the latter contained antibodies which destroyed the spirilla in dilutions of 1 in 50 to 1 in 100; even after a year the serum was still active, though to a less degree. Guineapigs do not develop antibodies against this organism and consequently succumb.

The spirilla are found to persist in the lymphatic glands of the rabbit, or in the skin, even a year after recovery, when the blood was proved to contain antibodies. In order to explain this curious fact the author is led to assume: (1) that autogenous antibodies are unable to pass through the walls of the blood vessels; and (2) an acquired immunity, which persists, is kept up by the presence of a latent infection. Suggestive experiments are recorded in support of these views. An axillary lymphatic ganglion was removed from a rabbit that had recovered from an attack of rat-bite fever. The ganglion was cut into two halves, one of which was inoculated directly into a guineapig, whilst the other half was mixed with the serum of the rabbit from which it had come, and then inoculated into another guineapig. The first animal developed a typical attack of the disease whilst the second remained uninfected. Similarly, infection was produced in guineapigs by inoculation of pieces of skin from recovered rabbits.

In support of the view that a latent infection is necessary for the continued presence of antibodies in rabbits, the author succeeded in sterilizing "recovered" animals by continued injections of neosalvarsan and Albert 102, and found that in such rabbits the antibodies gradually disappeared and the animals became susceptible to a second infection.

E. Hindle.

SCHOCKAERT (J.). Sur l'unicité des souches de *Spirillum minus*. [**The Unity of Strains of *Spirillum minus*.**—*C.R. Soc. Biol.* 1928. Mar. 2. Vol. 98. No. 8. pp. 595-597. [8 refs.] [Bact. Lab., Univ. Louvain.]

The author has compared three strains of *Spirillum minus*, one from a case of sodoku, and the others from a rat and mouse, respectively. The results of inoculations into patients and cross immunity experiments support the view that all the various strains of this organism constitute only one species with varying degrees of virulence.

E. H.

ABE (M.) & SHIMODA (T.). [**Therapeutic Effect of Oxyacetyl-Aminophenyl-arsinic Acid on Experimental Rat-Bite Fever in Rabbits.**—*Acta. Dermat. Kyoto, Japan.* 1927. Sept. Vol. 10. p. 347. [Summarized in *Jl. Amer. Med. Assoc.* 1927. Dec. 24. Vol. 89. No. 26. p. 2227.]

Rabbits infected with rat-bite fever were successfully treated by injections of the above mentioned compound. When the dose used varied from 0.2

to 0.35 gm. per kilogram of body weight the local lesions disappeared in two days and the blood spirochaetes in three, and when the dose was reduced to 0.025 gm., six doses at intervals of two or three days were sufficient to cure all symptoms of the disease.

E. H.

SCHOCKAERT (J.). L'action de quelques agents chimiothérapiques dans l'infection expérimentale à *Spirillum minus*. [**Action of Chemotherapeutic Agents in Experimental *S. minus* Infection.**]—*C.R. Soc. Biol.* 1928. Mar. 2. Vol. 98. No. 8. pp. 597-598. [Bact. Lab., Univ. Louvain.]

The author has tested the effects of a large number of compounds on mice and guineapigs infected with *Spirillum minus*. Neosalvarsan was found to be by far the best agent, but it was necessary to continue the injections for several days, as single injections were invariably followed by relapses.

E. H.

MASCI (Carlo). Sopra un caso di sodoku. [**A Case of Rat-Bite Fever.**]—*Ann. di Med. Nav. e Colon.* 1927. May-June. Year 33. Vol. 1. No. 5-6. pp. 342-347. ["La Spezia" Naval Hosp.]

A man of 20 years was bitten on the forearm by a rat and applied iodine the following morning. Twenty days later he had a rise of temperature to 40° C., which fell to normal by the third day. A second febrile attack occurred after an interval of four days. This was repeated, with little systemic disturbance. The spleen was slightly enlarged, as were also the glands, especially those in the right axilla, which were painful. There was a typical local rash, and a relative increase in the large mononuclears (14 per cent.) at the expense of the polymorphonuclears (58 per cent.). Examination of the blood, by smears and culture, and of gland-juice were negative for the spirillum. Treatment by neosalvarsan in graded doses from 0.15 gm. to 0.9 gm. at weekly intervals for six weeks brought about a cure, and the blood-picture became normal. The patient was in hospital for 2½ months. The disease is uncommon in Italy, about 30 cases only having been described.

H. Harold Scott.

WATSON (Jerre). **A Case of Sodoku.**—*Southern Med. Jl.* 1928. Apr. Vol. 21. No. 4. pp. 325-326.

A case diagnosed entirely by clinical symptoms, which seems to be the first record of sodoku in Alabama.

E. H.

INFECTIOUS JAUNDICE AND OTHER LEPTOSPIROSES.

BAERMANN (G.) & ZUELZER (Margarete). Die Einheitlichkeit aller tier- und menschenpathogenen Spirochäten vom Typus der *Spirochaeta icterogenes* syn. *icterohaemorrhagiae* und der mit ihr verwandten Wasserspirochäten vom gleichen Typus. II. Mitteilung. [The Identity of all Animal and Human Pathogenic Spirochaetes of the Type *Spirochaeta icterogenes* syn. *icterohaemorrhagiae* and also the Allied Water Spirochaetes. Part 2.]—*Cent. f. Bakt.* I. Abt. Orig. 1928. Feb. 15. Vol. 105. No. 6-8. pp. 345-367. [Central Hosp., Petoemboekan, Sumatra & Reichs Health Office, Berlin.]

This important paper is a continuation of that reviewed in the *Bull. of Hygiene*, Vol. 2, p. 777, in which details were given of three strains of water leptospira, isolated in Sumatra, which all became virulent to guineapigs after passage through a certain number of animals. *

The present article gives fuller evidence in support of the view that all animal and human pathogenic leptospira and also the allied water leptospira belong to one species, called by the authors *Spirochaeta icterogenes*.

Concerning the morphology of these forms it is generally agreed that there is no certain method of distinguishing between any of them, and therefore the authors at once proceed to consider the question of virulence.

Attention is called to previous work on this subject and in particular details are given of nine strains of free-living water leptospira, all of which have been made pathogenic in various ways; e.g., a strain of water leptospira Waz (Schuffner) had been kept in the laboratory for a considerable period; 2 cc. of a fresh culture were inoculated (subcutaneously, intracutaneously and intravenously) into a woman. After 4 days this woman showed a slight rise in temperature for 6 days without any other clinical signs. Blood was taken from the patient by vein puncture every day for 14 days from the date of the experiment, and inoculated into guineapigs. One of these animals, that had been inoculated intraperitoneally with blood collected on the 6th, 7th, and 8th days, showed typical symptoms of jaundice, after an incubation period of 26 days. This animal was killed and examined for leptospirae but none found; sections of the organs, however, showed typical lesions of Weil's disease.

The blood and organs were inoculated into three other guineapigs and cultures made from the heart-blood. All three animals showed leptospira on the third day and all died on the sixth day with typical symptoms of Weil's disease.

The patient's serum agglutinated and dissolved the original Waz strain, but had no effect upon the strain after passage through guineapigs, and also had no effect upon the water strain or any human or animal strain. Therefore, passage through two animals had completely changed the nature of this spirochaete, and moreover this change has persisted in subsequent cultures and passages.

The authors next proceed to compare the serological and immune reactions of various strains of human and animal leptospira with the water forms. A polyvalent horse serum with a titre of 8,000 was used, prepared by the inoculation of 136 Petoemboekan, 5 European Weil, and 3 *L. icteroides* strains. Agglutination and lysis was tested on 8 water strains which all gave negative results, but, with one doubtful exception, all these gave strongly positive reactions after passage through an animal.

Thirty-nine kinds of sera, including prepared rabbit antisera, and the blood of patients, were tested against cultures of 94 strains of Petoemboekan leptospira, 5 European strains of Weil's disease, 5 strains of *L. icteroides*, 1 strain of *L. hebdomadis*, 3 rat strains, and 6 pathogenic water strains.

The results indicate considerable divergences in the serological properties of the various strains and lead the authors to remark that the value of serological and immune biological reactions seem to be very problematical. For example, the serum of one patient (No. 8) who suffered from a severe, typical, and fatal attack of Weil's disease, agglutinated only two strains of Weil's disease (from Petoemboekan) and one of *L. hebdomadis*, but was negative with numerous other strains, including several Petoemboekan, the European Weil, *L. icteroides*, etc.

The leptospiras of this same patient, No. 8, were agglutinated by the sera of two other patients infected with Petoemboekan strains of Weil's disease, but were unaffected by all other sera used in this series of experiments.

L. hebdomadis antiserum agglutinated 7 strains of leptospira from typical cases of Weil's disease but had no effect on 129 other strains. With regard to *L. icteroides*, the authors find that it is undoubtedly identical with ordinary strains of Weil's disease.

Concerning leptospiral infections the authors are of the opinion that it is not possible to group them into different diseases caused by distinct strains of organisms, but that the explanation of differences in the clinical symptoms is to be looked for in quantitative variations in the infective dose, in variations in the virulence of the leptospirae, and in the constitution and temporary state of health of the infected human or animal organism. Consequently, they group together all the previously described leptospiras as one species, which they consider to be *Spirochaeta biflexa* syn. *icterogenes*, syn. *icterohaemorrhagiae*.

[The authors' conclusions raise the very difficult question of what is to be regarded as constituting a species. In dealing with the majority of bacteria and spirochaetes it is impossible to distinguish them with any degree of certainty by morphological characters alone, and consequently biological characters are usually employed. The experiments recorded in the paper reviewed above certainly support the view which has been advocated by the authors but, in spite of their results, it is a debatable point whether a retention of individual names for what many other authors have found to be biologically distinct races, is not more convenient. Concerning the experiments with *L. hebdomadis*, the possibility of its natural occurrence in the cases giving positive reactions does not seem to be entirely eliminated. If the authors' views are accepted the name of this leptospira should be *Spirochaeta* (*L. leptospira*) *interrogans* Stimson, who in 1907 gave this name to what was undoubtedly the same organism.]

E. Hindle.

BAERMANN (G.) & SMITS (E.). Diagnose, Klinik, Epidemiologie und Therapie der kurzfristigen Weilschen Erkrankung. III. Mitteilung. [Diagnosis, Symptoms, Epidemiology and Treatment of Mild Weil's Disease.]—*Cent. f. Bakt.* 1. Abt. Orig. 1928. Feb. 15. Vol. 105. No. 6-8. pp. 368-383. With 8 charts & 1 text fig. [Central Hosp., Petoemboekan, Sumatra.]

The authors have studied nearly 400 cases of a variety of Weil's disease occurring in Sumatra, which is distinguished from the typical disease by its short duration and comparative mildness of the symptoms. This disease is characterized by the presence of leptospira in the blood, the occurrence of a short attack of fever generally lasting 2 to 4 days, then a subfebrile or normal interval of 1 to 4 days, followed by another febrile attack. There may be as many as five relapses, gradually diminishing in severity, but commonly only two of them occur. The most characteristic symptoms, distinguishing it from ordinary Weil's disease, are the changes in the conjunctiva bulbi and the sclera. From the turned-up fold of the conjunctiva on the bulbus against the cornea, there is a very marked injection of the blood vessels, not unlike conjunctivitis, producing an acute, diffuse red inflammation, with a very distinct network of vessels and capillaries on the conjunctiva and sclerotic. Secretion is not increased and the bulbus has a yellowish-red dull opalescent sheen. This appearance is said to be the most constant symptom and is present in both mild and severe cases. Blood culture should be practised, however, in order to make certain of the diagnosis.

As culture media the authors employed 1 part of rabbit serum in 10 parts of either distilled or spring water, heated for 1 hour to 65°C. on three successive days. A few drops of the patient's blood, taken during the febrile attack, are mixed with this medium and kept in the dark at room temperature (24-30° C.). About 90 per cent. of the cases where blood was taken in the first febrile attack gave positive results after periods varying from 8 to 30 days.

Ordinary centrifuging of the blood, and also triple centrifuging, were tested but the results were most unsatisfactory, 30 leptospira being observed in only 6 out of 30 cases, which all gave positive results with the culture method. The inoculation of 5 to 10 cc. of venous blood from the patients into guineapigs gave positive results in 70 per cent. of the cases. In 20 per cent. the symptoms were those of typical Weil's disease, whilst the other 50 per cent. only showed the milder symptoms of the type with short febrile attacks. The prognosis is favourable, the mortality in about 400 cases being only 1 per cent., although it should be noted that some of the patients were treated with serum.

Reinfection seems to be rare, but in 2 cases occurred after 8 months.

Concerning the epidemiology of the disease the authors bring forward very convincing evidence that it is derived from water during bathing. This explains the incidence of the infection, which is almost entirely restricted to males, the females and children rarely going to bathing places and rarely becoming infected.

The authors discuss at length the various types of leptospiral diseases that have been described and show that they all seem to be varieties of one widely distributed species, originally present in water, which under varying conditions has acquired varying pathogenic properties.

For treatment the authors employed polyvalent horse serum prepared by injecting 100 local strains of leptospira, 3 *L. icteroides* strains, 5 European Weil strains, 5 water strains, 3 rat strains and *L. hebdomadis*.

The horse was injected as follows: 10 cc. of the mixture on the first day; 20 cc. after 8 days; and at 10 day intervals 40, 100, and 200 cc. respectively. Anaphylaxis is liable to occur owing to the presence of rabbit serum in the culture media.

This polyvalent serum, which is only used in severe cases, is given to the patients in fairly large doses. On the first day of the attack 60-90 cc.; then every other day 30-40 cc. until 200 cc. have been injected.

[This interesting paper is in continuation of the views described above by Baermann and ZUELZER and should be consulted in the original for more complete details.]

E. H.

BAERMANN (G.) & SMITS (E.). Spirochaetosis ictero-haemorrhagica ziekte van Weil. Mededeeling en algemeen referaat over ruim 300 meerendeels lichte gevallen, waargenomen in het Centraal Hospitaal Petoemboekan, Sumatra's O.K. [*Spirochaetosis Ictero-haemorrhagica (Weil's Disease)*].—*Nederl. Tijdschr. v. Geneesk.* 1927. Dec. 10. Vol. 71. 2nd Half. No. 24. pp. 2478-2495. With 4 charts. [6 refs.]

A group of obscure febrile conditions caused by spirochaetes and termed hitherto spirochaetosis febrilis is considered by the authors as a form of Weil's disease. They investigated about 300 slight cases which occurred during the last few years amongst Javanese coolies on plantations on the East Coast of Sumatra. They regard the different spirochaetes causing the various types of fevers as belonging to the same species and the clinical features of these conditions are to be considered as representing only gradations of Weil's disease. An injection of the conjunctiva is said to be a characteristic sign of the slighter forms of the disease. The main source of infection they consider to be water and mud, where spirochaetes of this type were frequently found. They do not attach much importance to rats as carriers of the disease. In severe cases injections of serum are recommended.

H. Lwow.

SCHÜFFNER (W. A. P.). De tegenwoordige stand van het leptospirovraagstuk. [*The Present State of the Leptospira Question*].—*Nederl. Tijdschr. v. Geneesk.* 1928. Mar. 31. 72nd Year. 1st Half. No. 13. pp. 1552-1562.

After briefly dealing with the morphological and biological properties of leptospirae in general, the author quotes the diseases which, as far as our present knowledge goes, are caused by parasites of this subgenus: Weil's disease, Nanukayami, the genuine form of blackwater fever (Schüffner), of which the specific leptospira has not yet been cultivated, leptospirosis febrilis (Vervoort, Kouwenaar). *L. icteroides* (Noguchi) is identical with *L. icterohaemorrhagiae* and recent research has shown the absence of leptospira in well established cases of yellow fever in Africa. BAERMANN and SMITS (later together with M. ZUELZER) cultivated leptospira from about 200 patients in Sumatra, and found the strains to be serologically much at variance. The difficulties they

experienced in differentiating between these strains induced these authors to neglect all the differences and to consider all the strains as varieties of *L. icterohaemorrhagiae*, differing chiefly in their antigenic structure. According to this theory, *Spirochaeta biflexa* (Wolbach & Binger) is the saprophytic type of *L. icterohaemorrhagiae*, which by prolonged cultivation (ZUELZER) or quicker by animal passages can change into the parasitic type. Others, including the author and his assistants, obtained only negative results in their attempts to show such a change in their strains. Schüffner emphasizes the serological specificity of the strains of leptospira (which is shown in tabular form) and stability of their serological properties in culture. This renders him sceptical of the views of BAERMANN [see above].

Though in most of the cases of Weil's disease in Holland the infection was caused evidently by submersion in polluted water, so far all attempts to cultivate the leptospira from those waters (canals, etc.) have yielded negative results. Contrary to the experiments in which repeated animal passages proved to be necessary to render the leptospirae pathogenic, in the accidental human cases a single dip in the polluted water was sufficient to cause the infection, which fact points to the presence of virulent leptospira.

Accepting the actual results of the experiments of BAERMANN, the author thinks that they are open to other interpretation. Admixture of virulent leptospira to the water strains, activation of leptospira living as commensals in the experimental animals (guineapigs) under influence of the unspecific shock caused by the injections, and—last, but not least—the possibility of spreading of leptospiroses in the guineapig stock by unknown ways of transmission in laboratories where much work in this respect is being done. Before we believe in such a pronounced lack of stability of the leptospirae as BAERMANN's experiments would show, every possible source of error must be excluded.

W. J. Bais

FLETCHER (William). **Recent Work on Leptospirosis, Tsutsugamushi Disease, and Tropical Typhus in the Federated Malay States.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1928. Jan. 31. Vol. 21. No. 4. pp. 265–282. With 17 figs. (8 on plates).

The present communication is confined to the author's observations on leptospirosis in the Malay States and contains a very useful account of the disease in that region and methods of diagnosis.

The author's culture medium consists of 5 cc. to 7 cc. of sterilized tap-water or distilled water, with the addition of 0.5 cc., or a little less, of rabbit's serum. In making a culture from a patient's blood about 0.5 cc. of blood is inoculated into the tube, which is generally examined with dark background at the end of a week. The earliest date on which leptospira were found was the second day, but this is exceptional and the cultures are often negative until the fifth or sixth day. One culture was negative on the sixteenth day, although numerous parasites were present three days later.

The diagnosis of the disease by examination of the patient's blood, stained by Fontana's method, gave unsatisfactory results, as leptospira were observed in only three cases out of thirty-two.

The results of cultures, when made from the patients' blood collected up to and including the seventh day, were always positive (except

one case of contamination), but later than this were rarely successful. Similarly, positive results were always obtained when guineapigs were inoculated with the patients' blood taken up to the seventh day. As a rule about 2 cc. of blood was used for the inoculation.

The results of examination of the patients' urine show that the leptospira continue to exist in the tubules of the kidney after they have disappeared from the blood. In most cases they were found for the first time about the fifteenth or sixteenth day, increased up to the twentieth day, and disappeared about the twenty-fifth.

Serological Classification.—Very interesting results were obtained when an attempt was made to classify the different strains according to their serological reactions. The organisms from 26 patients were examined, and also other strains obtained from various sources, and found to fall into six distinct groups. Group 1 included *L. icterohaemorrhagiae*, two strains of *icteroides*, two dog strains (OKELL), and only one of the Malay patients. Group 2, Akiyami A (*L. hebdomadis* Type A), included six Malay patients, numerous local black rats and one dog. Group 3, Akiyami B (*L. hebdomadis* Type B), included only one local patient in addition to the type strain obtained from INADA. Group 4, *L. pyrogenes* Vervoort, contained thirteen of the local cases in addition to the type. Group 5, Nallathamby, included three of the Malay cases and Group 6, Eruthyan, also contained three of these local cases. [The existence of these different serological types in patients apparently showing very similar symptoms, is of importance in considering the relationship of these different strains of Leptospira.]

Clinical considerations. Only one out of thirty-two cases ended fatally, and this was the only local case in which the leptospira gave the serological reactions of *L. icterohaemorrhagiae*. The most constant symptoms observed were the sudden onset and great prostration, and especially the agonizing muscular pain and tenderness. The presence of casts and albumin in the urine, although only in small quantity, is a characteristic feature and serves to distinguish the disease from dengue, with which the Malay leptospirosis has probably been confused in the past. The pronounced redness of the eyes is another important symptom, but jaundice was only well shown in seven patients. The duration of the fever varied from six to twelve days, and in five patients there was a secondary fever which came on five to eleven days after the first one and lasted for three to nine days.

A dog was found suffering from leptospirosis, and the organism was identical with *L. hebdomadis* of the Akiyami A type. Leptospira were also found in about 26 per cent. of the local black rats and serologically the majority of the strains belonged to the same group as the local dog strain. The remaining strains did not belong to any of the six groups previously mentioned.

Leptospira were isolated from the Kuala Lumpur water supply and other sources by using Hindle's method, and the organisms were inoculated into guineapigs. In some there was a rise in temperature on the tenth day, and in one case spotted lungs were observed, but the organism could never be recovered from any of the animals.

[The reviewer, in conjunction with Major H. C. BROWN, has found the simple culture medium used by the author to give very satisfactory results. The serological results contained in this article should be compared with those of BAERMANN and ZUELZER, reviewed above p. 602.]

BROWN (H. C.). **Epidemic Jaundice in the Andaman Islands.**—*Lancet*. 1928, Feb. 25. p. 388. [10 refs.] [Wellcome Bureau of Scient. Research, London.]

The author has tested the sera of certain cases of leptospiral infection from the Andaman Islands, employing the adhesion phenomenon and in one case agglutination tests in addition. The results show that the organism responsible for producing epidemic jaundice in the Andamans is serologically identical with the Rachmat and Deli A strains from Sumatra, but not with the Salinem strain also from Sumatra nor with any of the typical Weil's disease leptospira. The examination of the kidney and liver from one of these Andaman cases, by Dr. A. C. STEVENSON, suggests that it differs in some respects from typical Weil's disease. In particular, spirochaetes resembling *S. recurrentis* were found in the convoluted tubules of the kidney and typical leptospira in the cells and straight tubules. VERVOORT also found both types in the cultures from the blood of Sumatra patients.

[These observations suggest the possibility of a mixed infection, but this would not explain the undoubted serological distinctness of this strain when compared with strains from typical cases of Weil's disease.]

E. H.

DEUSKAR (V. N.). **Weil's Disease, as occurring in the Andamans.**—*Indian Med. Gaz.* 1928. Jan. Vol. 63. No. 1. pp. 1-10. With 1 map & 5 charts. [12 refs.]

A lengthy and diffuse article giving details of 23 cases diagnosed as Weil's disease on clinical grounds, occurring in Haddo Hospital during 1926. Apparently, leptospira were not seen in any of the patients and the few guineapigs inoculated were also negative.

E. H.

HOSOYA (Seigo) & STEFANOPOULO (G. J.). Sur la différenciation du *Leptospira icteroides*, du *Spirochaeta icterohemorragiae* et de certains autres spirochétidés voisins. [**Differentiation of *L. icteroides* and *L. icterohaemorrhagiae*.**—*C.R. Soc. Biol.* 1927. Dec. 2. Vol. 97. No. 33. pp. 1447-1450. [1 ref.] [Pasteur Inst., Paris.]

The authors have made comparative tests of the serological properties of six varieties of *Leptospira* viz.: *L. icteroides* Noguchi (3 strains); *L. icterohaemorrhagiae* Inada and Ido (3 strains); the spirochaete of Japanese Autumn Fever (Types A and B of KITAMURA and HARA); *L. hebdomadis*, and *L. pseudo-icterohaemorrhagiae*. The spirochaetes were cultured in the usual media at 29° C. and found to resemble each other very closely in morphology and general characteristics. When exposed to strictly anaerobic conditions all the organisms died within 24 hours. The first three varieties are virulent to guineapigs, whilst the last three rarely have any effect on them.

Agglutination tests, immunization experiments and the Pfeiffer tests were applied to these strains, and as a result the authors conclude that their strains of *L. icteroides* are identical with *L. icterohaemorrhagiae*, their results agreeing with those obtained by THEILER and SELLARDS [this *Bulletin*, Vol. 24, p. 709], SCHÜFFNER and MOCHTAR [*l.c.* p. 714]

and PUNTONI. On the other hand, Japanese Autumn Fever Types A and B, *L. hebdomadis* and the water leptospira were clearly distinct from the preceding and from each other.

E. H.

ZUELZER (Margarete). Zur Hydrobiologie der *Spirochaeta icterogenes* syn. *biflexa* in den Tropen. IV. Mitteilung. [**The Biology of *Sp. icterogenes* syn. *biflexa* in the Tropics.**]—*Cent. f. Bakt. I.* Abt. Orig 1928. Feb. 15. Vol. 105. No. 6-8. pp. 384-393. [Central Hosp., Petoemboekan, Sumatra.]

A general account of the biology of *S. icterogenes* in which the author compares its occurrence in Europe with that in the tropics, with special reference to the East coast of Sumatra.

This water leptospira was found to be almost ubiquitous, both in fresh water and in the sea. It grows best on slimy surfaces and is especially abundant in the presence of Beggiatoa and other bacteria, which raise the sulphur content of the water. Also they are more abundant when the nitrogen content of the water is high. Employing Hindle's cultural method, or by merely adding serum to the water, leptospira were found in very many different types of water, from clear running streams down to stagnant pools. The organisms were commonly found in association with other kinds of spirochaetes such as *S. pseudocurrentis*, *S. sumatrana*, *S. pseudopallida*, etc., and with Spirilla, Beggiatoa, Oscillatoria, and various types of Protozoa. They were also seen in a sample of water from Bangkok, Siam.

E. H.

UHLENHUTH & SEIFFERT (W.). Zur Chemotherapie der Weilschen Krankheit. [**Chemotherapy in Weil's Disease.**]—*Med. Klin.* 1928. Apr. 13. Vol. 24. No. 15 (1218). pp. 584-585. [4 refs.] [Hyg. Inst., Univ. Freiburg i. B.]

The authors have tested the effects of various colloidal preparations on guineapigs infected with a virulent strain of *Leptospira icterohaemorrhagiae* that usually killed the host in ten to twelve days. The results of a large number of experiments show that "Bismuth Yatren A" has a marked effect on the organism if the drug is administered at the right stage of the disease. For example, approximately 100 guineapigs were inoculated with leptospira and given curative doses on different days of the disease. Those treated on the sixth and seventh days all lived whilst of those treated earlier or later than this about half died.

In view of these results the authors consider that this drug might be tried for syphilis and recommend the intravenous injection of 2 cc. every other day, or an injection of 1 cc. alternating with 3 cc. at the same intervals.

The way in which the drug acts is still being investigated. When an infected guineapig is injected with this bismuth compound, leptospira disappear from its blood, but are still present in the internal organs. These organisms are resistant to bismuth, as was found by subinoculations. Later, however, the leptospira disappear entirely from the body and moreover such an animal is completely immune, not only against reinfection with the homologous strain, but also against other varieties of the organism.

E. H.

MATSUSHITA (Masanobu). [**Prevalence of Spirochetosis Icterohemorrhagica in the Coal Mines Chikuhō.**—*Tokyo Iji-Shinshi (Tokyo Med. News)*. 1927. June. No. 2526. [Summarized in *Japan Med. World*. 1927. Nov. 15. Vol. 7. No. 11. p. 332]

Among the cases of Weil's disease investigated by the author, the incidence in mine labourers was 0.517 per cent., whilst in coolies working in the open air it was only 0.06 per cent. The effects of prophylactic inoculation against the disease was tested in four mines with the following results.

	Incidence before inoculation.	Incidence after inoculation.
	Per cent.	Per cent.
First mine	0.95	0.26
Second mine	0.32	0.05
Third mine	2.62	1.09
Fourth mine	3.19	0.51

E. H.

LOEPER, SCHULMANN (E.) & LEMAIRE (A.). Un cas de spirochétose compliqué de souffle orificiel de l'aorte. [**Case of Weil's Disease with Aortic Aneurism.**—*Bull. et Mém. Soc. Méd. Hôpt. de Paris*. 1928. Feb. 2. Year 44. 3rd Ser. Vol. 52. No. 3. pp. 83-88. With 2 text figs. [6 refs.]

The description of a case of Weil's disease complicated by aortic aneurism, supposed to have been at least partially caused by the infection, as the swelling gradually subsided after recovery from the disease. The patient was in the habit of frequenting the bathing establishments on the Seine, to which the author attributes the source of infection.

E. H.

MULHOLLAND (H. B.) & BRAY (W. E.). **Spirochetal Jaundice: a Case in Virginia.**—*Jl. Amer. Med. Assoc*. 1928. Apr. 7. Vol. 90. No. 14. pp. 1113-1114. [4 refs.] [Univ. of Virginia Hosp., University, Va.]

The eighth proved case of this disease reported in the United States. The diagnosis was confirmed by inoculating a guineapig with the patient's blood taken on the fifth day of the disease. The animal died on the eighth day and leptospira were found in the kidney.

E. H.

HIYEDA (Goro). [**On the Fetal Infection by Spirocheta icterohemorrhagiae.**]—*Tokyo Iji-Shinshi (Tokyo Med. News)*. 1927. Sept. No. 2537. [Summarized in *Japan Med. World*. 1928. Jan. 15. Vol. 8. No. 1. p. 15.]

A report of a case of abortion of a 4 months old foetus by a woman suffering from Weil's disease. Although histopathological examination was negative, the author advances reasons for believing that the foetus had been infected.

E. H.

TAKAGI (Sampei). [**Passage of the Spirocheta of Akiyami-Fever and Weil's Disease through the Placenta.**]—*Aichi Igakkwai Zasshi (Jl. Aichi Med. Soc.)* 1927. June. Vol. 34. No. 6. [Summarized in *Japan Med. World*. 1928. Jan. 15. Vol. 8. No. 1. p. 17.]

The author observed spirochaetes in the placentas of guineapigs infected with both Weil's disease and Akiyami fever but the organisms could not be

found in the foetuses. It was found that the spirochaetes had been taken up by ciliated cells and other tissue on the outside of the embryo which seem to protect the foetus from invasion from the maternal body.

E. H.

WILBERT (R.) & DELORME (M.). Note sur la spirochétose ictéro-hémorragique du chimpanzé. [*Spirochaetosis of the Chimpanzee.*]—*C.R. Soc. Biol.* 1928. Feb. 10. Vol. 98. No. 5. pp. 343-345. [2 refs.] [Pasteur Institutes at Paris and at Kindia, French Guinea.]

The sera of two chimpanzees that had succumbed to leptospiral infection as previously described [*ante*, p. 102], were found to immobilize strains of *L. icterohaemorrhagiae* and *L. icteroides*, whilst the serum of normal animals had no effect.

[It is not clear why the authors persist in using the name "Sp. anthropopithecii," as it is obvious they are dealing merely with an outbreak of Weil's disease in chimpanzees.]

E. H.

KLARENBEEK (A.) Leptospirae (*Spirochaeta ictero-uraemiae canis*) als oorzaak van icterus, nephritis en uraemie van den hond. [*Leptospirae causing Jaundice, Nephritis, and Uraemia in Dogs.*]—*Tijdschr. v. Diergeneesk.* 1928. Mar. 1. Vol. 55. No. 5. pp. 227-234. English summary p. 235. With 3 figs. on 1 plate. [31 refs.] [Veter. Faculty, Royal Univ., Utrecht.]

A description of leptospiral jaundice in dogs [see this *Bulletin*, p. 103 and *Trop. Vet. Bulletin*, Vol. 13, p. 86] for which the author proposes the name of "Azotaemic Uraemia in dogs." The leptospira were found in the urine and tubules of the kidneys, and biologically closely resembled those of Weil's disease. The author considers that the dog, as well as the rat, may be able to infect man with the disease. Nevertheless he suggests the name "*Spirochaeta ictero-uraemiae canis*" for this organism from the dog.

[There is neither justification nor necessity for this cumbersome name, as the organism was previously named by LUKES and is shown by the author's own experiments, apart from those of OKELL, DALLING and PUGH, to be practically indistinguishable from the ordinary leptospira of Weil's disease.]

E. H.

SARDJITO (M.) & POSTMUS (S.). **The Occurrence of Leptospirae among the Rat Population at Weltevreden.**—*Meded. Dienst d. Volksgezondheid in Nederl.-Indië.* 1927. Part 3. pp. 680-689. With 2 folding tables. [11 refs.]

An examination of the rats at Weltevreden revealed the presence of leptospira in 4 out of 23 *Mus decumanus*, whilst 17 *Mus rattus* were all negative. Previous observers were unable to cultivate the organism, but the present authors succeeded in growing three of the strains in Noguchi's serum agar, by inoculating the tubes with renal emulsions from the infected rats. These leptospira were not affected by immune sera prepared from European and American strains, nor by a polyvalent anti-haemorrhagic serum. In guineapigs one was very virulent, two moderately so, and the fourth non-virulent.

These strains were subsequently compared with cultures of other leptospira when grown in Vervoort's serum-peptone-salt-medium, to which different sugars had been added. A vigorous growth was obtained with the leptospira strains Baermann, Baltimore, F., Krimmenic, Senen and Waterlooplein, in medium containing 1 per cent. glucose, lactose, arabinose, xylose, isodulcitol, dulcitol, mannose and inulin, respectively, and the pH concentration remained unchanged. A "Yellow Fever Strain" Le Blanc, did not show any growth and died out in serum-peptone medium containing 1 per cent. levulose, but grew well in the presence of the remaining sugars; levulose also slightly impeded the growth of the other strains. All the leptospira grew better when 0.5-1 per cent. arabinose or inulin was added to Vervoort's medium. The "Yellow Fever" and all other strains used in the experiment grew well in Noguchi's serum-agar containing 1 per cent. levulose.

[As the authors suggest, the behaviour of the so called Yellow Fever strain to levulose-serum-peptone is probably the result of long continued cultivation, since it is no longer virulent for young guineapigs.]

E. H.

DE ARAUJO (Eduardo). Da existencia de *Leptospira icterohaemorrhagiae* (Inada e Ido) Noguchi, em ratos da Bahia. [*Leptospira icterohaemorrhagiae* in Rats in Bahia.]-*Sciencia Med.* 1928. Feb. Vol. 6. No. 2. pp. 64-78.

The first cases of Weil's disease notified in Brazil occurred in Para in 1911 when a small outbreak arose. During the last three years investigations have shown that rats in Bahia, especially those caught in the Disinfectorio Central, are acting as reservoirs of the leptospira, and that infection is commonly direct. Whether there is any vector capable of transmitting the infection from man to man is not determined. The author succeeded in obtaining pure cultures of the organism from the heart-blood of infected animals on the fifth or sixth day of disease. This is important in view of the fact that many strains have but a feeble degree of virulence when passed to guineapigs from rats. The impression that the leptospira is locally distributed in the kidneys is due to the tendency for them to be held up in the twists of the convoluted tubules in the cortical region. The part played by the rat is believed to be that of restoring the virulence of an organism which has become deprived of this virulence by being subjected to outside influences.

H. Harold Scott.

SABRAZÈS (J.). Mode de coloration par la fuchsine phéniquée de Ziehl du spirochète de la fièvre jaune. [*Staining of Leptospira icteroides by Carbol Fuchsin.*]-*C.R. Soc. Biol.* 1928. Jan 27. Vol. 98. No. 3. pp. 239-240. [2 refs.]

The author finds that if films of *Leptospira icteroides* are first fixed according to Fontana-Tribondeau's method and then treated with 5 per cent. tannic acid, they can easily be stained with Ziehl's Carbol Fuchsin. The stain should be poured on the film, heated, allowed to cool and then poured off, this process being repeated four times, after which the film is washed in distilled water and allowed to dry.

E. H.

RENAUX (E.). Technique de coloration des spirochètes à propos d'une note de J. Sabrazès. [**Staining of Spirochaetes in Reference to Sabrazès' Note.**]—*C.R. Soc. Biol.* 1928. Mar. 23. Vol. 98. No. 11. pp. 866-867. [4 refs.] [Pasteur Inst., Brussels.]

A note calling attention to the fact that the method described by SABRAZÈS [see above] is practically identical with one described by RENAUX and WILMAERS in 1917, differing only in the preliminary fixation with formol acetic. The author now uses the following method for staining *S. pallida* :—

The films are dried in the air, fixed in Ruge's formol for 2-4 minutes and rinsed in 95 per cent. alcohol ; then mordanted for 10 minutes in a saturated aqueous solution of picric acid, washed in water, and stained for 10 minutes in either carbolized gentian violet or Ziehl's fuchsin.

E. H.

AMOEBIASIS AND DYSENTERY.

AMOEBIASIS.

GOURVITCH (Isaac). Erfahrungen ueber Amöbendysenterie in Tiberias im Jahre 1926. [**Amoebic Dysentery in Tiberias in 1926.**—*Arch. f. Schiffs- u. Trop.-Hyg.* 1928. Feb. Vol. 32. No. 2. pp. 62-69.]

Dysentery is least common in May; the largest numbers appear at end of year, in November and December. Malaria is also commonest then and the author notes that nevertheless it is very rare to find the two infections in the same patient; he has observed but two cases of combined chronic dysentery and chronic malaria. The great majority of cases of dysentery coming for treatment are apparently first attacks, though some "relapse" cases are encountered. In 3 cases dysentery developed 1 to 3 days after measles—yet during a measles epidemic there were hardly any cases of dysentery. Interesting observations were made on the comparative incidence of dysentery; e.g., among Spanish and Kurdish Jew immigrants it was much more common than among other European-Jewish immigrants. Dysentery was notably of a milder clinical form in the native born. In treatment emetine, yatren and stovarsol gave good results. The author makes it clear that the insanitary habits of the people and the plague of flies readily account for the widespread endemicity of dysentery. [Though this interesting paper purports to deal with *amoebic* dysentery, it nowhere makes it clear or probable that the author was in fact dealing with *amoebic* dysentery. It may safely be prophesied that bacillary dysentery will be shown to be far the commoner in Palestine—a demonstration that has already begun.]

H. M. Hanschell.

REMLINGER (P.). Quelques réflexions sur l'amibiase au Maroc et à Fez. [**Amoebiasis in Morocco.**—*Bull. Soc. Path. Exot.* 1298. Feb. 8. Vol. 21. No. 2. pp. 94-99. [2 refs.]]

The matter is passed in review in some detail. The author finds that amoebiasis, formerly non-existent in Morocco, is now very common there. The disease occurs most notably in Fez, the most dysenteric town in North Africa, and equally the favoured terrain of all intestinal parasites, protozoal or helminthic, which often give rise to no obvious symptoms, but sometimes serve to aggravate the symptoms of dysentery, or even to produce a dysentery-syndrome of their own accord; especially is this so with trichomonas and lamblia. The author plainly considers that sanitary matters are now, as they were, extremely insanitary.

H. M. H.

HUTCHISON (Harry S.). **Observations on Endamebic Dysentery.**—*Jl. Lab. & Clin. Med.* 1928. Apr. Vol. 13. No. 7. pp. 613-621. [20 refs.] [American Mission Hosp., Tanta, Egypt & the Dept. of Path., Western Reserve Univ. & Cleveland City Hosp.]

A careful review of the subject. The author's conclusions are:—

"(1) The correct interpretation of an amebic lesion depends upon a clear recognition of the status which exists between the host and parasite, and the secondary modifying factors which may intervene to obscure the picture.

" (2) The fact that amebic infection exists without symptoms or with very minor symptoms and minor lesions often leads to failure in recognizing cases.

" (3) Recognition of cases without symptoms is possible only through search for cysts in the stool. Experience has taught that even then only positive findings are conclusive, as cysts may not appear in the stool of carriers over considerable periods of time, depending upon the extent of the lesion and whether or not it is progressing or regressing.

" (4) Recognition of cases with dysenteric symptoms consists in the identification of vegetative amebas, precystic forms or cysts in the absence of more obvious etiology.

" (5) The recognition of amebic ulceration depends upon the gross appearance only as it is suggestive; the final decision rests on finding amebas in the lesions."

H. M. H.

STUART (M. A.). **General Considerations on Amoebic Dysentery and Endamoebic Carriers, from the Viewpoint of a Naval Surgeon.**—*U.S. Nav. Med. Bull.* 1928. Apr. Vol. 26. No. 2. pp. 411–438. [21 refs.]

No new observations nor any recommendations by the author are here recorded. The paper is a careful comprehensive review of the observations of many authors, particularly with reference to American troops and conditions, which have already received notice in this *Bulletin*. The paper, however, is not without value as a reference-compendium for American naval and army surgeons.

H. M. H.

CHUECA (Feliipe). *Disenteria amebiana en la infancia.* [**Amoebic Dysentery in Infants.**]—*Cronica Méd.* Lima. 1928. Jan. Vol. 45. No. 775. pp. 25–36. With 6 charts in text.

Infants and young children are by no means exempt from amoebic infection in Lima. The author analyses 76 cases below two years of age and 22 cases less than six months old. He found the disease even among breast-fed infants, and thinks that infection in some at least was fly-borne. Cases are divided clinically into acute, subacute, chronic and latent (larvada). The last refers to those with slight intestinal disturbances, often referred to teething or some transient digestive upset, which would be overlooked if faecal examinations were not done. The disease in the very young is more serious than in adults; anaemia is more profound, relapses common, and the mortality is higher. The most satisfactory treatment consists of emetine by injection and arsenicals, e.g., novarsenobenzol, by mouth. For those intolerant of emetine yatren was substituted either by mouth or by rectal injection.

H. Harold Scott.

DEUTSCH (D.). *Zur Therapie der Amöbenruhr bei Kindern.* [**Treatment of Amoebic Dysentery in Children.**]—*Deut. Med. Woch.* 1927. Feb. 25. Vol. 53. No. 9. pp. 360–362.

The usual doses of emetine recommended for children, 1/12 and 1/20 of that for adults, are, in the author's experience in Palestine, ineffective. He recommends for 6 months old infants doses of 0.01–0.02 gm.; for one year olds 0.03–0.05 gm., total quantity up to 0.12 gm.; for yet older

infants up to 0.15 gm.—by injection. Vomiting may result but is not serious. The doses must be smaller for weak infants. Yatren is now established as practically a specific against all forms of dysentery—in 2 per cent. high clyster it is effective for dysentery in children. For bacillary dysentery the value of castor oil is stressed. Calomel is on the whole harmful in children. Other drugs are discussed. Ice per rectum procures quick relief from pain. Finally the matter of diet is fully dealt with.

H. M. H.

LYNCH (Kenneth M.). **Intestinal Amebiasis of the Rat and Man.**—*Southern Med. J.* 1928. Feb. Vol. 21. No. 2. pp. 87–91. With 8 text figs. [7 refs.] [Med. College of State of S. Carolina, Charleston, S.C.]

In 1915 the author first published his observations concerning the possibility of the rat being carrier of *Entamoeba histolytica*, based on his successful experimental transmission of infection from man to rat, from rat to rat, and on his discovery also of natural infection of wild rats with an amoeba indistinguishable from *E. histolytica*. These observations have received confirmation by BRUG (1918), KESSEL (1923) and CHIANG (1925) [this *Bulletin* Vol. 22, p. 743].

CHIANG infected white rats with *E. histolytica* of human origin, and proved pathogenicity of amoebae recovered from the rats by rectal injection into kittens, and also discovered in laboratory rats a natural intestinal infection with amoebae morphologically closely resembling *E. histolytica* of human origin.

The author's findings, here carefully described [but not successfully illustrated by the tissue microphotographs], show, as he claims, that the muco-sanguineous colitis of his rats experimentally infected with *E. histolytica* of human origin very closely resembles clinically and in morbid anatomy that of acute intestinal amoebiasis in man.

In his rats found to be naturally infected with an amoeba indistinguishable from *E. histolytica* the intestinal disease is evidently chronic: there may be no ulcers of mucosa; ulcers may be numerous and superficial or few and deeper and more extensive. Amoebae may be found deep in mucosa, or in these ulcers, or only in the lumen in the non-ulcerated type; in fact, as he points out, conforming to the type in man which is coming into recognition as the more common form of intestinal amoebiasis, and is distinct from the rarer acute amoebic dysentery. These rats have formed stools and are outwardly in normal condition.

The author records morphological details in living and stained specimens to show that these amoebas are indistinguishable from *E. histolytica*. [A contention feebly supported by microphotographs of the rat amoeba.]

H. M. H.

FISCHER (Otto). Ueber Amöbenhepatitis. [**Amoebic Hepatitis.**]—*Muench. Med. Woch.* 1927. Oct. 14. Vol. 74. No. 41. pp. 1739–1741. With 6 charts. [4 refs.] [Inst. for Ship & Trop. Diseases, Hamburg.]

The author bases this paper on his observations on a series of cases of affections of liver occurring in the Hamburg Institute for Tropical Diseases. In all cases clinically suggestive of general septic infection

who have recently been, or long dwelt in the tropics, amoebic hepatitis must be considered; and in all cases emetine must be given. Local symptoms may point to cholecystitis or cholangitis; icterus, however, is seldom present in amoebic hepatitis. Patients from tropics whose only complaint is pain in right hypochondrium and right shoulder should always be given emetine treatment. The author gives emetine hydrochlor., intravenously; on the first day 0.05 gm. in 2-3 cc. of physiological salt solution. If this is well tolerated 0.1 gm. is thus given 24 hours later; and then a like dose every second day until 7 injections have been given. Not more than 1 gm. all told is given; emetine has cumulative effect, and more than this may cause intoxication. Actually 0.65-0.7 gm. is usually sufficient. After a pause of 6-8 weeks the injections may be repeated. Besides this emetine course, in cases where no amoebae are found in stools and rectoscopy reveals no changes in mucous membrane, pills of Yatren purissimum 105, 1-3 daily are given for one week. After 2-3 injections of emetine fever and symptoms disappear and there is rapid recovery. The emetine course must be repeated to prevent relapse.

H. M. H.

BEZANÇON (Fernand) & BERNARD (Etienne). Volumineux abcès amibien du foie ouvert dans les bronches ayant par son début simulé une pneumonie et par les vomiques une suppuration pulmonaire.—Interprétation des signes radiologiques.—Guérison par l'émétine et le novarsénobenzol. [**Large Hepatic Abscess. Radiology. Treatment.**]—*Bull. et Mém. Soc. Méd. Hôpit. de Paris.* 1928. Jan. 5. Year 43. 3rd Ser. Vol. 51. No. 38. pp. 1728-1745. With 7 text figs. [15 refs.]

This case is carefully and very fully reported, illustrated, and critically discussed. To summarize further than its title does would be to spoil—for its interest lies in the close comparative valuation of symptoms and physical signs; and the shadowy data of radiography to be peered at rather than read of.

H. M. H.

FAURE-BEAULIEU (Marcel). Abcès amibien autochtone du lobe gauche du foie. [**Amoebic Abscess of Left Lobe of Liver.**]—*Presse Méd.* 1928. Mar. 3. Vol. 36. No. 18. pp. 283-284.

A male patient, 26 years old, collapsed suddenly with acute abdominal pain and fever; but abdominal muscles not very rigid and no distention of abdomen. No history of dysentery, no previous residence in tropics; no amoebae or cysts found in stools. Later tumour felt apparently in left lobe of liver. Exploratory puncture recovered chocolate sterile pus; no amoebae or cysts found in stools nor in pus. Steady improvement and final apparent cure after emetine therapy.

H. M. H.

PIROT. Abcès du foie guéri par l'émétine. [**Liver Abscess cured by Emetine.**]—*Arch. Méd. et Pharm. Nav.* 1927. Oct.-Nov.-Dec. Vol. 117. No. 4. pp. 330-336.

The patient, a man 23 years old, had had no diarrhoeic attack during 16 months' service in the Far East. He first complained of pain in right shoulder. This continued for 10 days during which there developed pain

over hepatic region, wasting, heavy night sweats and high fever. No icterus; urine normal. The liver was enlarged and tender. No cysts or vegetative amoebae, and no helminth ova were found in stools. Complete return of liver to normal and disappearance of all symptoms followed on a course of emetine injections. No exploratory puncture was undertaken.

H. M. H.

WIRSSALADSE (S.). Zur Diagnose der Leber- und Subdiaphragmalabszesse. (Neue Beobachtungen.) [**Diagnosis of Liver and Subdiaphragmatic Abscess.**].—*Abhandl. a. d. Gebiet d. Auslandskunde. Hamburg. Univ.* 1927. Vol. 26. (D., Med. & Vet. Vol. 2.) [Festschrift NOCHT.] pp. 594–604. [7 refs.] [Hosp. Clinic, Univ., Tiflis.]

The matter is discussed very fully and illustrative cases are reported. The author concludes by declaring that correct diagnosis rests on due attention to and appreciation of history, temperature reaction, feeble septic condition of patient, light icteric tinge of skin, definite leucocytosis, exploratory puncture, and the nature of the material thus obtained, radioscopic findings, presence of fluctuation in liver region, circumscribed tenderness on palpation and percussion—all plain objective symptoms corresponding to pathological-anatomical relations and changes. There should be a painstaking clinical examination of the patient especially to exclude any other possible cause for the fever and illness.

H. M. H.

FIESSINGER (Noel) & CASTERAN (Robert). Le syndrome pleuro-pulmonaire de la base dans les abcès du foie. L'exploration lipidolée des abcès du foie. Dédutions de pathologie générale. [**The Pleuropulmonary Syndrome in Liver Abscess.**].—*Bull. et Mém. Soc. Méd. Hôpit. de Paris.* 1928. Jan. 5. Year 43. 3rd Ser. Vol. 51. No. 38. pp. 1746–1757. With 1 chart & 2 text figs. [4 refs.]

In this paper the authors very fully and critically discuss the subject matter. It is not possible to summarize it fairly. They claim that their observations reveal the importance, and the diagnostic difficulties, of pleuro-pulmonary congestions (right and left—this last complicated by suppurative pericarditis), as early manifestations of a liver abscess which may emerge only weeks or months later; that the amoebic is a "cold" abscess; that with an enormous abscess fever may disappear in 24 hours after an emetine injection; that absorption of pus follows slowly; and that simple puncture-aspiration and emetine therapy can cure huge abscesses.

H. M. H.

GRASSET (E.) & FOURQUIER (G.). Sept cas d'amibiase pulmonaire en un an et demi dans une localité de la banlieue parisienne. [**Seven Cases of Pulmonary Amoebiasis seen in 1½ Years in a Parisian Suburb.**].—*Bull. Acad. Méd.* 1928. Mar. 18. Year 92. 3rd Ser. Vol. 99. No. 11. pp. 345–349.

The authors suggest that pulmonary amoebiasis is endemic in France, though unrecognized; and in support record briefly seven cases of middle-aged patients, two of whom had been in the tropics, and one of

these had definitely had dysentery in the tropics ; all suffered for periods of months or years from bronchitic or other pulmonary syndrome with coughing up of blood-stained muco-purulent sputa, in which no tubercle bacilli were demonstrated, but in which the authors readily found many amoebae. They particularly note that the sputa must be examined fresh and warm ; then amoebae are often so numerous, in clumps or scattered, as to constitute 60 to 70 per cent. of the cellular elements. These amoebae contained erythrocytes and sometimes bacteria, were motile and displayed well marked hyaline pseudopodia. All these cases improved greatly or were cured by emetine or treparsol. In a footnote BRUMPT considers that these observations do not in fact establish these amoebae as *Entamoeba dysenteriae* (*E. histolytica*). This can be done only by morphological study after special staining and above all after intra-rectal inoculation into kittens.

H. M. H.

VIALARD & PAPONNET. Un cas d'amibiase pulmonaire pure à rechute définitivement guéri par l'émétine, le stovarsol et le tréparsol. [**Case of Pulmonary Amoebiasis cured by Emetine, Stovarsol and Treparsol.**]—*Bull. et Mém. Soc. Méd. Hôpit. de Paris.* 1928. Mar. 15. Year 44. 3rd Ser. Vol. 52. No. 9. pp. 452-456.

A male 29 years old, serving on the Yangtse Kiang, suffered from muco-sanguineous diarrhoea, *E. histolytica* being found in the stools. On this and two subsequent occasions he recovered under hypodermic or intravenous injections of emetine. Later he had a sudden attack of severe stabbing pain under right nipple with rigors, sweats, dyspnoea and fever ; three days later cough and blood-stained sputa. No enlargement or tenderness of liver or spleen, normal stools. He received emetine injections intravenously. A few days later examination of bloody sputa revealed no Koch's bacilli, no amoebae, no spirochaetes. Radioscopy showed mobile diaphragm, and a dark shadow at base of right lung. Intravenous emetine injections procured apparent cure—but the symptoms recurred. Again search in sputa gave negative results, and "cure" this time was procured by intravenous injections of emetine followed up by a course of tréparsol. Patient has remained well for 3 years.

H. M. H.

LEMIERRE (A.) & KOURILSKY (R.). Un cas d'abcès amibien du poumon confondu avec une pleurésie interlobaire et guéri par l'émétine. [**Case of Amoebic Abscess of Lung with Pleurisy cured by Emetine.**]—*Bull. et Mém. Soc. Méd. Hôpit. de Paris.* 1928. Jan. 26. Year 44. 3rd Ser. Vol. 52. No. 2. pp. 56-67. With 3 text figs. [8 refs.]

The case is described in the fullest possible detail. The physical signs, symptoms, and their differential diagnosis are critically discussed, and at great length.

There was no history suggesting any form of amoebiasis in the patient's past, nor any actual signs of its presence then. The authors based their diagnosis of amoebic abscess of lung on the two facts only : (1) that aspiration recovered a-microbic (sterile) pus, and (2) the case improved and was eventually pronounced cured after a course of emetine injections. Neither pus nor sputa revealed amoebae.

H. M. H.

HABERFELD (Walther). Bronchitis und Peribronchitis amoebiana. [**Bronchitis and Peribronchitis Amoebiana.**]—*Muench. Med. Woch.* 1927. Oct. 28. Vol. 74. No. 43. pp. 1834-1835.

Besides other extra-intestinal invasions by amoebae, that of the lung is now well known; either by extension from liver abscess, or rupture of liver abscess into lung; or by metastatic extension into lung. Amoebic bronchitis, or rather peribronchitis, resembles clinically tuberculosis, or the broncho-spirochaetosis of Castellani.

The author describes in full detail the case of a 23 year old patient, with cough and blood-stained sputa lasting for 12 years, in whom no dysentery or disease of liver or intestines had ever been noted. All tests for syphilis, tuberculosis, bronchitis of Castellani, and blastomycosis repeated during many years had always been negative. During an attack of fever with pleuritic pain an operation for empyema was carried out. Later X-ray showed dilatation of the smaller bronchi. Finally the author demonstrated in the fresh sputa characteristic amoebae. They did not contain erythrocytes, and no cysts were found. The possible routes of infection are discussed. Probably this was a case of inhalation infection. The amoebae vanished from the sputa, and the patient's condition was cured after treatment with emetine.

H. M. H.

TRAHAUD. Les formes cérébro-méningées de l'amiabiose. [**Cerebromeningeal Forms of Amoebiasis.**]—*Rev. Prat. Malad. des Pays Chauds.* 1927. Nov. Year 6. Vol. 7. No. 11. pp. 550-557.

Five cases are briefly described whose symptoms and physical signs suggested in some cases acute meningitis only, in others the involvement of brain as well. The "meningitis" cases, however, had quite normal cerebro-spinal fluid: instead, they either had had dysentery, or amoebae or cysts were found in the stools, or condition improved after emetine therapy. [The evidence here reported, and not too briefly yet seriously discussed and proclaimed by the author, for an amoebic origin of, or influence on, these syndromes could hardly be more flimsy.]

H. M. H.

BA CHOW (J.). **A Case of Chronic Amoebic Infection, especially affecting the Vermiform Appendix.**—*Indian Med. Gaz.* 1928. Feb. Vol. 63. No. 2. p. 82.

A male, 26 years old, emaciated, with oedema of feet and frequent diarrhoeic stools. Lavage through caecostomy was decided upon. The vermiform appendix was found thickened and adherent and was removed. A faecal mass at its tip and its lumen filled with muco-pus containing numerous active amoebae, here called *E. histolytica*, though repeated examination of stools had revealed no amoebae. Recovery with formed stools.

H. M. H.

DAVEY (J. B.). **Sporadic Case of Amoebic Dysentery.** [Miscellanea.]—*Ann. Trop. Med. & Parasit.* 1927. Dec. 31. Vol. 21. No. 4. p. 479.

A man, aged 60 years, for 26 years an employee at a sewage farm, suffered for 4 months from diarrhoea; no pain; blood and mucus in stools.

Abdominal and sigmoidoscopic examination revealed nothing abnormal, nor did X-ray after barium enema. The microscope revealed in the faecal mucus red blood cells and many motile amoebae containing many r.b.c.s with clear pseudopodia, but ill-defined differentiation between endo- and ecto-plasm. No cysts. No non-lactose-fermenting coliform organisms recovered on plating out stool. After two courses of bismuth-emetine-iodide no amoeba or cysts were found in stools. This patient had never been out of England and no source of infection could be found in his household. His occupation, the author thinks, suggests the source of infection.

H. M. H.

CHEREFEDDIN (Osman). Amöbenephritis und Lungengangrän. [**Amoebic Nephritis and Gangrene of Lung.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1927. Nov. Vol. 31. No. 11. pp. 526-529.

The author states that after the Armistice and occupation of Constantinople by "Entente" troops, an epidemic of amoebic dysentery occurred. Its origin was probably from "carriers" among the multi-coloured troops of occupation—Indians, Chinese, negroes. In addition many Turks from war prisoners' camps in India and Egypt arrived infected with amoebic dysentery. This disease has since then been endemic in Constantinople; many complications—liver abscess, pleurisy empyema, rupture of liver abscess into peritoneal cavity, amoebic appendicitis, perforation of intestine, pericolitis—have been noted. Recently the author has found in addition brain abscess, gangrene of lung and pyelonephritis. Reference is made to the cases of amoebic pyelonephritis described by PETZETAKIS in Alexandria. Clinical descriptions are given of two typical cases of the author's; in neither had there been any previous dysentery.

The symptoms were lumbar pain, fever, and urine containing albumin leucocytes, red blood cells, few casts. X-ray showed no stone, and tubercle was excluded by guinea-pig inoculation. Cystoscopy revealed only slight inflammation of bladder. In urine obtained from ureter were typical amoebae, many containing red blood cells. Other cases but with previous dysentery have been observed. All got well after treatment with emetine alternating with spirocid; other therapy had failed. Finally the author describes a case in which physical signs, symptoms and X-ray findings, led to a diagnosis of abscess or gangrene of lung. The patient's stools contained blood and mucus in which were typical amoebae; amoebae were found also in the sputa. Symptoms and physical signs and amoebae disappeared and the patient was restored to health after emetine treatment.

H. M. H.

VAN CUTSEM-FRANCO (Alberto). Un cas d'amibiase urinaire. [**Case of Urinary Amoebiasis.**]—*Bruxelles-Méd.* 1928. Mar. 25. Vol. 8. No. 21. pp. 711-712.

A child 4½ years old, in Kambove, Katanga, Congo Belge, was found to be passing scanty bloodstained urine. No pain, no icterus, and otherwise not suffering. Three specimens of urine, all equally bloody, indicated the kidney as source of the haemorrhage.

The microscope revealed, besides numerous erythrocytes, some granular and hyaline casts, a few crystals and epithelial cells and many granular cells about 30μ diameter, exactly resembling "Amoeba Loeschia histolytica" in the precystic stage. Some of these "amoebae" contained red blood cells; they were never seen to be motile.

The child's urine returned to normal after emetine therapy. The stools did not reveal any amoebae. Two years previously there had been an attack of dysentery.

H. M. H.

ROCCA (Giuseppe Cascio). Un caso di cistite da *Entamoeba histolytica*. [**A Case of Amoebic Cystitis.**]—*Riforma Med.* 1928. Mar. 26. Vol. 44. No. 13. pp. 346-348. [27 refs.] [Hyg. Inst., Univ., Palermo.]

A man, 31 years, suffered in 1917 from an attack of dysentery. Three years later his urine became turbid, sometimes of a reddish colour. This symptom continued off and on till 1924 when examination of the urinary sediment revealed *Entamoeba*, both vegetative and cystic, and cystoscopy showed a mild degree of cystitis. Emetine benefited greatly both dysentery and urinary trouble, but in December, 1927, faeces still contained vegetative and cystic forms of *Entamoeba*, the former persisting in the urine.

H. Harold Scott.

PETER (F. M.). Rivanol in der Behandlung der Amöbendysenterie. [Erste Mitteilung.] [**Rivanol in the Treatment of Amoebic Dysentery.**]—*Muench. Med. Woch.* 1927. Oct. 7. Vol. 74. No. 40. pp. 1709-1711. [3 refs.] [Works Hosp., Surinam Bauxite Co., Moengo, Dutch W. Indies.]

The author's attention was drawn to solution of rivanol in rectal clyisma, in treatment of dysentery by URCHS (1926) [see this *Bulletin*, Vol. 24, p. 363.] Dr. Peter now gives a lengthy account and discussion of a small series of cases in adults, children, and babies, of dysentery clinically and microscopically amoebic in origin treated by rivanol solution 1-10,000 in rectal clysmas, 3-4 daily for 3-4 days. In every case the rivanol clyisma was followed by rapid fall of fever, disappearance of pain, tenesmus, and blood and slime in stools, return of stools to normal faeculent consistency, and recovery of appetite and general health. After two to three days of this treatment vegetative and encysted forms of *Entamoeba histolytica* had disappeared from the stools. In one case in which rivanol 1-5,000 was tried spasmodic contraction of the colon resulted. URCHS had claimed rivanol to be effective only against symptoms and the secondary infection of the specific ulcers. The author, however, claims for it direct action on the amoebae and, as well, a sedative and anaesthetic action on the inflamed and irritated gut. He noted that JOSEPH found it to have anaesthetic action on the bladder, and that BUSSING procured relief from pain in gonococcal epididymitis by injecting rivanol solution. The author has no doubt that rivanol has now been shown to be a gratifying and valuable addition to the medical armamentarium.

H. M. H.

BETEAU (J. P.). Note sur la thérapeutique antiamibienne. [**Treatment of Amoebiasis.**]—*Rev. Méd. et Hyg. Trop.* 1928. Mar.-Apr. Vol. 20. No. 2. pp. 45-47.

This note recounts success in treating amoebic dysentery by intramuscular injections of a compound of bismuth and arsenic iodides, Trio-Iodo Ercé (Laboratoires Robert et Carrière). It is also claimed that this drug is equally efficacious in malaria.

H. M. H.

CRAIG (Charles F.). **Complement Fixation in the Diagnosis of Infections with *Entamoeba histolytica*.**—*Amer. Jl. Trop. Med.* 1928. Jan. Vol. 8. No. 1. pp. 29-36. [3 refs.] [Army Med. School, Washington, D.C.]

The author had already described occurrence of haemolytic and cytolytic substances in alcoholic extracts of *Entamoeba histolytica*, which, used as antigens in tests with sera of persons infected with this parasite, revealed complement fixation, while negative results were obtained with sera of persons not infected with the parasite [*ante*, p. 228].

In this paper he gives full details of his further work on this phenomenon which is yet put forth only as a preliminary contribution. His conclusions may be given :—

(1) In blood serum of persons infected with *E. histolytica* there occur complement fixing (C.F.) bodies which can be demonstrated by using as antigen alcoholic extracts of cultures of this parasite.

(2) The C.F. reaction disappears in *E. histolytica* infected cases after treatment has eliminated that parasite.

(3) Persons not infected with *E. histolytica* do not give a positive C.F. reaction when their blood serum is tested with such extracts of the parasite.

(4) The reaction does not occur in individuals infested with *E. coli*, *E. nana*, *Iodamoeba williamsi*, *Trichomonas hominis*, or *Chilomastix mesnili*. Probably, therefore, there is no positive reaction in other protozoan infections, when such extracts are used as antigens.

(5) The reaction does not occur in persons suffering from other infections or diseases.

(6) The reaction does not occur in persons giving a positive Wassermann or Kahn reaction unless *E. histolytica* is present.

(7) The reaction occurs not only in those presenting definite symptoms of *E. histolytica* infection, but also in those with mild indefinite symptoms, and in "carriers" with no symptoms of the infection.

(8) The practical diagnostic value of this test is still uncertain because of the difficulty in securing suitable antigens and the technical difficulties of the test; moreover nearly every case giving a positive reaction can be diagnosed by microscopical examination of faeces, or of cultures of the organism from the faeces.

H. M. H.

ALEXEIEFF (A.). Remarque à propos du mémoire de A. W. Sellards et W. A. Baetjer (1927), the Occurrence of Atypical Amoebiasis. (*Parasitology*, xix. 48-53, Plate I.) [**Remarks on Sellards and Baetjer's Paper on "The Occurrence of Atypical Amoebiasis."**]—*Parasitology*. 1927. Sept. Vol. 19. No. 3. pp. 333-334. [1 ref.]

This paper describes briefly the plasmophage (macrophage) originating from Unna's plasma cell and its development and varying morphology. It has often been confused with *E. histolytica*, for example by SCHAUDINN, HARTMANN, BRUMPT, and SELLARDS and BAETJER. On the other hand, J. Gordon THOMSON (1926) has correctly distinguished and described this macrophage. [SELLARDS and BAETJER'S paper was noticed in this *Bulletin*, Vol. 24, p. 787.]

H. M. H.

BACILLARY DYSENTERY.

PERRY (H. Marrian) & BENSTED (Harold J.). *Bacillus dysenteriae* Sonne as an Aetiological Agent of Dysentery in Egypt.—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1928. Feb. 25. Vol. 21. No. 5. pp. 417-420. [6 refs.] [Public Health Lab., Cairo.]

The careful record of a series of cases of enteritis and entero-colitis in children and adults in Egypt from which the *Bact. dysenteriae* Sonne was isolated. The organism recovered corresponded biochemically and serologically with the classical strains isolated by SONNE. It is not suggested that this organism is more than one of the bacillary agents responsible for intestinal infections of this type, prevalent in Egypt during the warm season, but it is of importance to note that it was the only aetiological agent isolated from 35 to 40 per cent. of a series subjected to careful investigation.

H. M. H.

SARDJITO (M.). Een dysenterie-epidemie, veroorzaakt door de bacillen van Shiga-Kruse in Moearadoewa, Afdeeling Rangkasbetoeng, Residentie Banten. [**A Dysentery Epidemic caused by Shiga-Kruse Bacilli.**]—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1928. Vol. 68. No. 1. pp. 68-79. With 2 diagrams. [4 refs.] [Med. Lab., Weltevreden, Java.]

—. **A Dysentery Epidemic caused by the Bacilli of Shiga-Kruse in Moearadoewa, District of Rangkasbetoeng, in the Residency of Bantam.**—*Medea. Dienst d. Volksgezondheid in Nederl.-Indië.* 1928. Vol. 17. Pt. 1. pp. 52-62. With 2 diagrams & 5 figs. on 3 plates. [4 refs.]

Among the instructions issued to the author for dealing with the epidemic were: (1) that half the affected population were to be inoculated with prophylactic vaccine, (2) that stools of both inoculated and controls were to be examined with a view to detection of infection before symptoms were manifest. The transmission of infection was regarded as due probably to contact infection and not to water or to flies. In the course of the investigation the possibility of isolation of Shiga bacilli from Endo plates, which had been sown 4 days previously with faecal test material, was shown. A suggestion is made that by this means bacteriological examination may be conducted at the nearest laboratory without the necessity of despatching a bacteriologist in person to a district affected by epidemic.

The vaccine (SARDJITO, this *Bulletin*, Vol. 24, pp. 27; 372) contained 500 million Shiga bacilli lysed by bacteriophage, 1,500 million ordinary Shiga bacilli and the same numbers of atoxic dysentery bacilli per cc., and was sterilized with 1 per cent. formalin. The selected dose for an adult was 1.5 cc. Neutralization of the vaccine with sod. hydroxide was necessary before use, as the formalin gives rise to considerable pain on injection. Children bore the vaccination well and 103 individuals in all were vaccinated. Unfortunately the epidemic came so quickly to an end that no indication was furnished of the success of the trials of vaccine.

W. F. Harvey.

MANDRY (Oscar Costa). **Bacteriological Study of Dysentery in Porto Rico. A Preliminary Report.**—*Porto Rico Rev. of Public Health & Trop. Med.* 1928. Jan. Vol. 3. No. 7. pp. 259-266. With 1 chart.

The author's summary of his interesting paper is to this effect:—

(1) Though vital statistics show that "diarrhoea and enteritis" cause more deaths in Porto Rico than any other group of diseases, the number of deaths attributed to either bacillary or amoebic dysentery is comparatively small. A more thorough clinical and laboratory study of this large group of infections is needed.

(2) A bacteriological study of the stools in seventy-seven cases of acute diarrhoea revealed the Flexner type bacillus in six, but no other dysentery-group organism (one of the cases proved fatal).

(3) Examination of stools from seventy-two controls revealed no dysentery bacillus carriers.

(4) Other organisms, including *B. paratyphosus B*; *B. enteritidis*; *B. supestifer*; of possible import in intestinal disorders, were found in both the diarrhoeal and non-diarrhoeal (control) cases.

H. M. H.

SEVERN (A. G. Millott) & **EVANS** (Ewart W.). **A Localised Outbreak of Bacillary Dysentery in Smethwick.**—*Lancet.* 1928. Jan. 21. pp. 126-127.

One case of dysentery in Smethwick had been reported in 1924; and since 1919 only 20 cases in a local population of over 75,000. The outbreak in July-August, 1927, here recorded, was limited to families residing on the first and second floors of a tenement house. There were ten cases, no deaths. The common source of infection was traced to the water supply—contained in an iron tank. Only women and children were affected; presumably the men took their liquid refreshment outside their homes. Dysentery bacillus of Flexner type was isolated from the stools of five of the patients. From stools of one man in these family groups a Flexner bacillus was isolated. He was in apparent good health, but had suffered from dysentery in Salonica in 1918. How this carrier had contaminated the water in the tank was not determined.

H. M. H.

BÜCHNER (S.). Untersuchungen ueber die Verbreitung der Ruhr im Kindesalter. [**Range of Dysentery in Childhood.**]—*Jahrb. f. Kinderheilk.* 1928. Jan. Vol. 118. (3rd Ser. Vol. 68). No. 5-6. pp. 285-295. [8 refs.] [Univ. Child. Clinic, Münster.]

An interesting record of a series of cases carefully observed. Out of 160 cases of clinical or suspected dysentery in children bacillary dysentery was proved bacteriologically or serologically in nearly one half of the cases over 6 months in age, and in nearly all of those over two years in age. By culture methods dysentery bacilli were demonstrated in one-third of the cases over 6 months old, and in over half of those over two years in age. Bacillary dysentery plays an important part in the disturbances of nutrition of children. In 166 children with apparently healthy intestines, the blood serum of four-fifths of those over one year old, and of 90 per cent. of those over 6-13 years old, agglutinated dysentery bacilli. This points to the possibility of there

being infection with dysentery bacilli without any concomitant symptoms of dysentery. In two infants at breast showing dysentery symptoms paratyphus A bacillus was isolated.

H. M. H.

PACHECO (Genesio). Modification de la méthode permettant d'établir le diagnostic de la dysenterie bacillaire en vingt-quatre heures. [**A Method of establishing the Diagnosis of Bacillary Dysentery in 24 Hours.**]—*C.R. Soc. Biol.* 1928. Mar. 2. Vol. 98. No. 8. pp. 633-634. [1 ref.] [Oswaldo Cruz Inst., Rio de Janeiro, Brazil.]

The author promises a further communication giving more details of procedure and interpretation of results. Meanwhile he records here that Andrade is the best indicator. This in acid solution of 1 in 500,000 gives a plain rose tint. It is not, moreover, reduced by bacteria. He has also found Haffer's catalase test useful. With Shiga bacillus it is always negative, with the other dysentery bacilli always positive. The test consists in adding oxygenated water to a fresh bouillon culture; a positive result is shown by formation of gas bubbles.

H. M. H.

MONTEL (L. R.). Administration du sérum antidysentérique *per os* et en lavements dans le traitement de la dysenterie bacillaire. [**Administration of Antidysenteric Serum by Mouth and by Rectum.**]—*Bull. Soc. Path. Exot.* 1928. Jan. 11. Vol. 21. No. 1. pp. 16-18. [2 refs.] [Polyclinic, Saigon.]

Several years' experience has convinced the author of the quicker beneficial results that follow rectal clysters of antidysenteric serum and giving the serum by mouth, instead of by the usual subcutaneous injection. The clysters should be preceded by an evacuant alkaline lavage of the bowel. In particular he has noted cessation of tenesmus after the first serum-clyster.

H. M. H.

KNAUER (H.). Serumtherapie bei kindlicher Ruhr. [**Serum Therapy in Dysentery of Children.**]—*Muench. Med. Woch.* 1926. Nov. 12. Vol. 73. No. 46. pp. 1924-1926. [8 refs.]

The author gives a general review of his experience during four years in the treatment of dysentery in infants and children with antidysentery serum. The infections, established bacteriologically, were Y bacillus, Flexner, Shiga-Kruse and Gärtner; the best results with the antidysentery serum were obtained in Y infections. The author insists that the doses of serum should be large. Intramuscular injections are painful and intravenous injections require assistance. He has given the serum intraperitoneally with no untoward results, but with great benefit to the patient in doses from 100 to 300 cc. These may be repeated daily. The injection procures rapid decrease of toxæmia; improvement in stools takes longer to appear; if delayed long, he has found benefit follow treatment by a vaccine. Dieting is a necessary

and important part of treatment. Sometimes vaccine has been given as an after treatment with good results. The mortality in serum treated cases was 30·4 per cent., that in cases without serum 42·9 per cent.

H. M. H.

VAZ (Eduardo). Contribuição ao tratamento da dysentéria bacillar. [**The Treatment of Bacillary Dysentery.**]—*Brasil-Médico*. 1928. Mar. 24. Vol. 42. No. 12. pp. 320–326.

The author briefly records 18 cases in support of his plea for the early and intensive use of polyvalent vaccines for treating bacillary dysentery. He records wonderful results attained even before the time usually needed to establish a diagnosis. One example will suffice: A man gave a history of passing frequent stools with blood and mucus accompanied by tenesmus and colic, for eight days. He was given 80 cc. of vaccine by mouth in the course of 8 hours. The symptoms disappeared, but 40 cc. more were given on another day "to consolidate the cure"—which was complete by the time the organism was identified.

H. Harold Scott.

IONESCO-MIHAIESTI (C.) & DAMBOVICEANU (A.). Recherches sur la résistance des toxines diphtérique et dysentérique aux différentes concentrations en ions hydrogènes. [**Resistance of Diphtheria and Dysentery Toxins to Varying Hydrogen Ion Concentration.**]—*Arch. Roumaines Path. Experim. et Microbiol.* Paris. 1928. Jan. Vol. 1. No. 1. pp. 115–121. [10 refs.] [Lab. of Experim. Med., & Serotherap. Inst., Bucharest.]

Stabilized toxins in bouillon which had been kept in ice for some months under toluol were used. The final reaction of the diphtheria toxin was pH7·9 and that of dysentery pH8·1. For the experiments the toxins were diluted with buffer solutions of varying pH. These buffer solutions were themselves tested for their toxicity between the limits pH3·5 and 10·01. The extreme alkaline solutions gave rise in guineapigs to a pronounced oedema which disappeared in 36 hours, while the extreme acid solutions produced a necrosis which disappeared in 7 or 8 days.

1. The experiments showed that the action of H or OH ions is not immediate on the diphtheria toxin. If the diphtheria toxin dilutions were inoculated 30 minutes after preparation, the toxic action was unaltered between the limits of pH 4·7 and pH9·6, as shown by the deaths of the animals. When inoculated 24 hours after preparation toxicity contracted to within the range pH5·7 to pH9.

2. In the case of dysentery toxin a certain length of time of action was also required for the destructive action of H or OH ions. A 30 minutes interval to time of use showed little or no alteration of toxic effect within the range pH2·07 and pH11. After 24 hours it was found that toxic action was lost between pH2·5 and pH3·0, but unaffected for the rest of the range. No limit was found on the alkaline side at which destruction of toxin took place.

The conclusion is drawn that diphtheria toxin is much more easily destroyed than dysentery toxin, and that this seems to indicate an essential difference in their chemical composition.

W. F. Harvey.

BERDNIKOV (A.). Sur la marche de la protéolyse dans les cultures des bacilles dysentériques. [**The Course of Proteolysis in Dysentery Cultures.**]—*C.R. Soc. Biol.* 1928. Jan. 27. Vol. 98. No. 3. pp. 210-211. [4 refs.] [Pasteur Inst., Paris.]

A table is given of the proteolysis determined by various dysentery bacilli in terms of nitrogen, expressed as a percentage of the total nitrogen in the bouillon culture. The quantity of proteids giving a biuret reaction diminishes proportionately to the diminution of virulence of the type of dysentery organism, Shiga, Flexner, or Y, whilst nitrogen under the form of polypeptid, amino-acid, or amino-base, and volatile nitrogen increases. This is equivalent to saying that increase in the proteolytic power of a dysentery bacillus is highly correlated with decrease in its toxic power. It would indicate that saprophytic character is allied to the acquirement of higher proteolytic power.

W. F. Harvey.

MORIN (H. G. S.) & GUILLERM (J.). Principe lytique anti-Shiga de certaines eaux de Cochinchine. [**Anti-Shiga Lytic Principle in Certain Waters of Cochin China.**]—*C.R. Soc. Biol.* 1928. Mar. 2. Vol. 98. No. 8. pp. 575-576. [5 refs.] [Pasteur Inst., Saigon.]

The filtrate of the test water was added to a culture of a type strain of the Shiga bacillus obtained from the Paris Pasteur Institute, to demonstrate the occurrence of lysis. Serial transmissibility of the lytic effect was shown with those waters which contained bacteriophage. The results were negative for the waters of Cai-Cau and Trang-Bang, positive for Rach-Gia and Mekong, with the respective salinities of 0.017, 0.563, 0.073, and 1.217 gm. per litre.

W. F. Harvey.

ARISAWA (T.). Ueber einen neuen Nährboden für die Isolierung der Typhus-, Paratyphus- und Dysenteriebacillen. [**A New Medium for Isolation of Typhoid, Paratyphoid and Dysentery Bacilli.**]—*Fukuoka-Ikwadaigaku-Zasshi (Fukuoka Acta Med.)*. 1927. Mar. Vol. 20. No. 3. German summary pp. 22-23. [In Japanese.] [Med. Faculty, Imperial Univ., Fukuoka.]

The medium has the composition: 3 per cent. nutrient agar of pH 7.3, 100; chemically pure lactose 1; 5 per cent. alcoholic pyocyanin blue 0.1; 10 per cent. sod. sulphite 5; 2 per cent. metachrom yellow 3. If the metachrom yellow is omitted, there is no effect produced upon the development of typhoid and paratyphoid bacilli, whilst that of colon bacilli is rather inhibited and dysentery bacilli do not grow at all. With the addition of the metachrom yellow no inhibition of the growth of dysentery bacilli occurs. Lactose fermenters give whitish violet colonies and non-lactose fermenters yellowish. Air organisms do not grow well on this medium.

W. F. Harvey.

RAMALHAO (Carlos). Bacille para-dysentérique isolé d'un cas grave et mortel de dysentérie bacillaire. [**A Paradyntery Bacillus from a Fatal Case of Dysentery.**].—*C.R. Soc. Biol.* 1928. Apr. 27. Vol. 98. No. 13. pp. 1167-1168. [Bact. Lab., Faculty of Med., Oporto.]

The organism was isolated in 1920. It was gram-negative, scarcely motile, non-liquefying; it coagulated and acidified litmus milk, gave a positive indole reaction and fermented lactose, glucose and saccharose; agglutination occurred at 1-100 with Shiga serum and at 1-300 with Flexner serum; it produced an abscess only on subcutaneous injection in the rabbit. The serum prepared to this organism agglutinated it at 1-1,200, but did not agglutinate *Bact. dysenteriae* (Flexner), *Bact. dysenteriae* (Shiga), or *Bact. coli*. The preserved culture has been used along with those of Shiga and Flexner in current routine diagnosis of suspected dysentery.

W. F. Harvey.

MAYEDA (Inashire). [**On the Influence of Bivalent Metallic Salts against the Pathogenic Bacteria. II. Experiments with *Bacillus dysenteriae* Shiga.**].—*Kei-O-Igaku (Jl. Kei-O-Med. Soc.)*. 1927. Mar. Vol. 7. No. 3. [Summarized in *Japan Med. World.* 1927. Oct. 15. Vol. 7. No. 10. pp. 305-306.]

Shiga dysentery bacilli cultivated in medium containing bivalent metallic salts for 60 generations showed morphological changes, weaker immunological reactions than the original strain, and diminished protective power against the original strain. Their toxicity, however, was equal to that of the original strain.

W. F. Harvey.

INOKUCHI (Kiyoshige). [**Studies on the Immunological Characteristics of the Medium and Bacterial Sediments of the Shiga Dysentery Bacillary Vaccin. II.**].—*Tokyo Igakkwai Zasshi (Jl. of Tokyo Med. Soc.)*. 1927. Sept. Vol. 41. No. 8. [Summarized in *Japan Med. World.* 1928. Feb. 15. Vol. 8. No. 2. p. 42.]

Broth culture medium, freed from the bodies of Shiga dysentery bacilli is more effective in immunization than the bacilli themselves. The bactericidal power of a serum obtained by the use of this broth medium as antigen was greater and remained potent for a longer time than that furnished by injection of bacillary bodies.

W. F. Harvey.

VAZ (Eduardo). Da importancia da technica de preparo da vaccina anti-dysenterica. [**On the Importance of the Technique in the Preparation of the Anti-Dysenteric Vaccine.**].—*Rev. Biologia de Hyg. São Paulo*. 1927. Vol. 1. No. 2. pp. 65-74. English summary pp. 74-75. [9 refs.] [Butantan Inst., S. Paulo, Brazil.]

The dysentery vaccine referred to is a Shiga vaccine and the mode of administration *per os*. Cultures in liquid media show almost no toxicity. Their immunogenic power is better with bouillon culture than with cultivation in peptone water. Good aeration of cultures is essential. Filtrates are found to be as good, or better, for immunization as whole cultures. The vaccine is prepared by cultivation for 3 weeks of several strains of Shiga bacilli, whose immunogenic power has been tested on rabbits, in bouillon of pH 7.8. Sterilization is effected by 2.5 per cent. formalization.

W. F. Harvey.

POWELL (L.). Du mecanisme de la vaccination anti-dysentérique par voie buccale. [**Mechanism of Immunity developed by Oral Antidysenteric Vaccination.**—*C.R. Soc. Biol.* 1928. Feb. 10. Vol. 98. No. 5. pp. 350-351. [Pasteur Inst., Paris.]

Rabbits were immunized *per os*, first with killed cultures and then by living virulent cultures. The minimum lethal dose was one agar culture and they were enabled to withstand two cultures. The blood, which had agglutinated before treatment at 1 in 10, had its titre raised to 1 in 200 to 300 and remained at this level for a month. When a comparison was made of the protective power of rabbit serum on mice, which received on the day following the serum a subcutaneous injection of 1-50th part of dysentery agar culture, it was found that the immune serum protected 75 per cent. and a normal serum 40 per cent. The author concludes from the comparatively small difference of protection that the mechanism of oral immunization in rabbits is not to be ascribed to antibodies in the blood.

W. F. Harvey.

BLANC (Georges) & CAMINOPETROS (J.). Recherches expérimentales sur la vaccination antidysentérique chez l'homme. [**Experimental Antidysenteric Vaccination in Man.**—*C.R. Acad. Sci.* 1927. Dec. 27. Vol. 185. No. 26. pp. 1625-1627. [1 ref.]

Animal experimentation has the disadvantage in dysentery that animals are very sensitive to dysentery toxin but are not susceptible of infection. Therefore such experiments are, to that extent, inconclusive for the case of man. The authors have definitely adopted trials in the human subject, in which comparison is made between oral administration of vaccine, subcutaneous inoculation of killed organisms, subcutaneous inoculation of living organisms and controls receiving no prophylactic treatment. Both Shiga and Flexner dysentery organisms were used. Those who underwent oral treatment were given 4 doses of either 5 cc. of a thick suspension of killed bacilli or 10 cc. to 30 cc. of dysentery toxin at 8 to 10 day intervals, while those subcutaneously injected received 5 to 6,000 million organisms, at the same intervals. The test of the efficacy of the vaccination procedure consisted in the ingestion of living cultures of Shiga or Flexner bacilli 25 days after the last prophylactic dose. The results were, in the following order for orally treated, subcutaneously injected with killed bacilli, subcutaneously treated with living bacilli and untreated :—

(1) Shiga.—8 attacked with dysentery out of 13, 5 out of 8, none out of 13, and 7 out of 10.

(2) Flexner.—1 dysentery out of 1, 2 out of 2, none out of 7, and 1 out of 1.

The numbers are small but, so far as they go, are greatly in favour of the subcutaneous injection of living Shiga or Flexner organisms. The conclusion drawn is that the inoculation of living organisms is innocuous and efficacious, innocuous for the individual receiving the injection and innocuous in the sense that there is no danger of producing dysentery carriers.

W. F. Harvey.

BERSENIEFF (A. P.). Vaccination par voie buccale contre les colites. [**Oral Vaccination against Colitis.**].—*C.R. Soc. Biol.* 1928. May 4. Vol. 98. No. 14. pp. 1179–1180. [Microbiol. Inst., Ivanovo-Voznesensk, Russia.]

A mixed vaccine, in which the organisms were killed by formalin of concentration 0.02 per cent., was used in the course of an epidemic of colitis. It has the composition per cc. of 50,000 million *Bact. coli* and *Prot. vulgaris* and 50,000 million of the dysentery bacilli of Shiga, Flexner, and Hiss. This was administered fasting on three days in succession. The results obtained were that out of 239 vaccinated only one case of simple diarrhoea occurred and one case of mucous diarrhoea, while out of 123 unvaccinated there occurred 4 cases of simple diarrhoea, 9 of mucous diarrhoea, and 4 of haemorrhagic diarrhoea.

W. F. Harvey.

MIXED AND UNCLASSIFIED DYSENTERY.

DE CASTRO (A. Bayley) & DEUSKAR (V. N.). **Some Observations on Dysentery in Port Blair, Andaman Islands.**—*Indian Med. Gaz.* 1927. Dec. Vol. 62. No. 12. pp. 667–675. With 7 charts. [9 refs.]

This long paper gives full details of a careful investigation. It is illustrated by tables and graphs recording incidence and mortality; clinical and autopsy records are quoted; and malaria and rain charts are given. In 1926 the authors dealt with amoebic dysentery 29 cases and three deaths; amoebiasis (intestinal, without dysentery or diarrhoea) 15 cases, 2 deaths; acute bacillary dysentery 63 cases, 4 deaths; chronic bacillary dysentery 8 cases, 2 deaths; colitis 80 cases, 1 death; diarrhoea 15 cases, no death; acute gastro-enteritis 1 case, 1 death. They stress the occurrence of amoebic ulcerative lesions of gut over long periods of time without manifestation of symptoms or inconvenience to the patient. Their cases of amoebic dysentery were in much higher proportion (40 per cent.) to bacillary than that estimated for India. They found a decided tendency to seasonal prevalence of amoebic dysentery similar to that for bacillary: the only reasonable explanation is the marked increase of fly population during these months. Comparative observations lead them to conclude that intravenous injection of emetine has no advantage over hypodermic injection in causing amoebae to disappear from stool more quickly or in being followed by fewer relapses. In 5 years no cases of hepatic abscess, and 4 only of hepatitis, have been met with.

H. M. H.

WATS (R. C.), LOGANADAN (A. D.) & CONQUEST (C. N.). **Dysentery in Secunderabad.**—*Indian Med. Gaz.* 1928. Jan. Vol. 63. No. 1. pp. 13–16. With 1 chart.

The authors declare that MANIFOLD's work (see this *Bulletin*, Vol. 23, p. 395) inspired them to undertake these observations and to classify their dysentery cases scientifically. Following his technique they found bacillary dysentery nearly nine times more common than amoebic. It was possible to cultivate the organism from nearly 50 per cent. of cases; the great majority were due to Flexner type bacillus. The

main source of infection is undoubtedly the carrier. Among 838 menials—food handlers—3·4 per cent. were found to harbour *B. Flexner*, and 3·4 per cent. *E. histolytica*. Five of them harboured *Bact. typhosum*.

Of 159 muco-sanguineous stools from which *Bact. dysenteriae* group were isolated, 144 (90·6 per cent.) were alkaline to litmus, the rest (9·4 per cent.) gave acid reaction; these last were stools sent to laboratory after two or more hours' delay. In six cases of mixed infection, beginning as bacillary dysentery but pathogenic amoebae found on or after fourth day, the reaction was alkaline. Alkaline reaction alone therefore is not sufficient to exclude presence of pathogenic amoebae. No diagnostic importance was attached to "amoebic" exudate or Charcot-Leyden crystals. Out of 178 cases from which specific bacilli were isolated 129 or 72·5 per cent. showed definite "bacillary exudate" at first examination; a few exhibited this at a later date. Those showing no "bacillary exudate" were of milder nature, containing much mucus with little blood and all due to Flexner type bacillus.

Importance of time in examination of specimens.—Of 165 stools from hospital quite close to laboratory the dysentery bacilli were cultivated in 76, or 46 per cent. Of 252 stools from hospital 1½ miles from laboratory dysentery bacilli were cultivated from 87, or 34·5 per cent.

H. M. H.

MANIFOLD (J. A.) assisted by DE MONTE (A. J.). **Report on an Investigation of Dysentery and Diarrhoea in Poona. Part I. General Findings and Epidemiology. Part II. Laboratory Findings.**—*Indian J. Med. Res.* 1928. Jan. Vol. 15. No. 3. pp. 601–641. With 11 charts. [6 refs.]

A record of an exhaustive investigation, thoroughly carried out and a model for future investigations into dysentery in India. Only the gist of the author's conclusions can here be given:—

The diarrhoea known as: (1) Poona-itis is largely a mild Flexner infection, not diagnosed as dysentery in the past because of its mildness.

(2) Bacillary dysentery, mainly *B. Flexner*, accounts for most of the severer cases; these were usually diagnosed as amoebic dysentery in former years.

(3) *B. Shiga* plays only a minor part in Poona dysentery; and if such cases report sick on first or second day of attack and are treated at once the cases are usually as mild as the *B. Flexner* infections.

(4) By microscopic examination of mucus it is possible to separate mild bacillary dysentery from diarrhoea in nearly all cases, if hospitals and laboratory co-ordinate properly.

(5) "Dysentery group" as a diagnosis is a confession of failure, and in the main such cases in Poona have been *B. Flexner* infections.

(6) Bacillary dysentery and diarrhoea are present throughout all months of the year and increase in numbers in the monsoon period.

(7) Amoebic dysentery is a comparatively rare disease among the troops as contrasted with the prevalence of bacillary dysentery.

Epidemiology.—(1) Chlorination of water supply in Poona is efficient. The water supply is not responsible for either dysentery or diarrhoea now endemic in the cantonments.

(2) There is a heavy infection of *B. Flexner* dysentery among the Indian population in the cantonment.

(3) This is passed by them to the European population and to each other by direct contact (hands, etc.), throughout the year.

(4) Existing sanitary arrangements in Poona are absolutely ideal for the spread of bacillary dysentery.

Laboratory Findings.—(1) Of 117 strains 71·7 per cent. only are agglutinable by Flexner V, W, X, Z and Y serum after many months' subculturing.

(2) Four hours in water bath at 55° C. are insufficient to overcome inhibition zones, and inagglutinability. Eight hour readings have given higher titres of agglutination, and reduced number of inagglutinable cultures by 15·3 per cent.

(3) Only 51 per cent. of the agglutinable cultures examined could be assigned to definite strains by the agglutination method given in *Medical Research Series Special Report No. 42*. The results did not correspond with those found in the serological examinations of the patients' serum, and in one case at least were proved to be incorrect on ascertaining the agglutino-genesis of the infective strain.

(4) Agglutino-genesis experiments and absorption tests are probably required for a definite typing of most strains of B. Flexner, except old laboratory cultures.

(5) Inagglutinability and lack of agglutino-genetic power appear to be closely related.

(6) Evidence of at least one strain with apparently no antigenic relationship to B. Flexner V, W, X, Z and Y has been found, and there are probably many others.

H. M. H.

KODAMA (Tokuzo). **The Prevention of Dysentery in Manchuria.**—*Jl. Public Health Assoc. Japan*. 1928. Feb. Vol. 4. No. 2. pp. 1-6.

The incidence of dysentery in the South Manchurian Railway zone was 7·5 per 1,000 of population, a much higher rate than in Japan proper while the death rate was 10 to 15 per cent. as against 20 per cent. in Japan proper. In South Manchuria there are better facilities for detection of cases. Patients cannot be hidden, and are early placed in hospital. The sources of infection were food and drinks, and flies. There was scarcely any infection from water and very few from contact. Very few cases were amoebic—nearly all were bacillary. Shiga type predominated, next came Y and S types. Shiga is most numerous at beginning of the epidemic; gradually other types appear, among which Y is commonest. Most of the patients were three to four years old; those above seven were very few.

Both dysentery and disturbances of the alimentary canal were remarkably reduced by continuous execution of preventive measures, viz., night soil and other waste removed once daily, and "tetrachloride preparations" sprinkled as germicide. House and surroundings cleaned daily and kept clean. Public washing places cleansed every day. Encouragement of disinfection of vegetables and fruits by washing them in chlorinated water, in every home.

H. M. H.

AGUIAH (A.). Du syndrome dysentérique infantile dans les pays du Proche-Orient. [*Infantile Dysentery in the Near East.*]—*Bruxelles-Méd.* 1928. Apr. 29. Vol. 8. No. 26. pp. 855-863.

An interesting and long paper recording the author's observations. He has carried out in each case:—

(1) Microscopic examination of stools to determine whether dysentery was amoebic, and culture from stools as well to determine if it were bacillary.

(2) Examination of peripheral blood for parasites.

(3) Search in stools for helminth ova.

On this basis he classifies his cases of dysentery into four groups :—

(i) *Non-specific*—comprises all those in which no microbial agent, bacillary or protozoal, can be demonstrated.

(ii) *Specific*—all those in which dysentery amoebae or bacilli can be demonstrated.

(iii) *Parasitic*—Ascariasis, oxyuriasis.

(iv) *Toxic*—chemical agents, mercurial and arsenical.

(v) *Secondary*—parenteral infections—e.g., typhoid fever and la grippe. Diagnosis and treatment of each group is discussed. He lays stress on the necessity of dietetic treatment in infants suffering from dysentery. For the rest, bacillary dysentery must be treated by anti-dysenteric serum; amoebic by emetine and arsenicals.

H. M. H.

MÜHLENS (P.). Gefahren und Behandlung der Folgen der Amöben- und Bazillendysenterie. [**Risks and Treatment of Sequelae of Amoebic and Bacillary Dysentery.**]—*Muench. Med. Woch.* 1927. Oct. 28. Vol. 74. No. 43. pp. 1832-1834. [18 refs.] [Tropical Inst., Hamburg.]

While emetine is of undoubted value in acute amoebic dysentery, hepatitis and liver abscess, for the more chronic sequelae of amoebic and bacillary dysentery the drug of choice is yatren. Even in hepatitis and liver abscess the author quotes cases showing cure of these conditions by emetine yatren, or even by yatren alone. In the other *sequelae of amoebic dysentery*; viz., chronic dysentery, cystitis, bronchitis, iritis, cerebral abscess, arthritis, membranous and ulcerative colitis, obstinate constipation, and the very numerous cyst passers, all of which have failed to respond to emetine treatment, and for the *sequelae of bacillary dysentery*—viz., chronic dysentery, ulcerative, membranous and mucous colitis, and spastic constipation, the author claims, and quotes cases in support, favourable results and often cure after yatren treatment, mainly by yatren lavage per rectum. Beneficial results from yatren cases have also been reported in sprue cases.

H. M. H.

CHATTERJEE (Bijoy Krishna). **A Case of Balantidial Dysentery.**—*Indian Med. Gaz.* 1928. Feb. Vol. 63. No. 2. p. 79.

A Hindu male, a *ganja* smoker, had suffered for fifteen years from dysentery. After a dose of mag. sulph. his stools revealed many motile *Balantidium coli*. The interest of this case lies in the rarity of *Balantidium coli* infections in India. Patient had not been associated in any way with pigs or monkeys—the natural hosts of the parasite—but he had often eaten porcupine, which perhaps is another host for *Balantidium*. Apparent cure was effected by thymol per os, and protargol per rectum. This patient had bouts of severe abdominal colic—possibly because deprived of his *ganja*; they were cured by a few small doses of *Cannabis indica*.

H. M. H.

LUGER (A.) & KORKES (L.). Ein Beitrag zur Emetinbehandlung der Balantidiencolitis. [**Emetine Treatment in Balantidial Colitis.**]—*Med. Klin.* 1928. Mar. 2. Vol. 24. No. 9. pp. 330-332.

An exhaustive account of a man who had had pyloric ulcer, and later developed tuberculosis. He suffered from diarrhoea. *Balantidium coli* was found in the stool. Rectoscopy revealed oedematous inflamed mucous membrane, the mucus from which showed besides *Balantidium* many spirochaetes. Emetine intravenous injections were followed by disappearance of *Balantidium* from the stools. Two months later the patient died; tubercle of lungs and small intestine was then demonstrated, together with atrophy of mucous membrane of colon, no ulceration and no *Balantidium*. The patient had been associated with pigs. *Balantidium* infection has hitherto been very rare in Austria.

H. M. H.

HENRY (T. A.) & BROWN (H. C.). **An Indian Remedy against Dysentery.** [Correspondence.]—*Lancet.* 1928. Jan. 14. p. 108. [7 refs.]

An account of experience of *Holarrhena dysenterica* bark (Kurchi bark) in England, with references.

A. G. B.

CAPISTRANO PEREIRA (Sebastião). A proposito de um caso de dysenteria amebiana.—*Sciencia Med.* 1927. July. Vol. 5. No. 7. pp. 370-376.
DOPTER. L'amebiasi polmonare.—*Riforma Med.* 1927. Aug. 1. Vol. 43. No. 31. pp. 736-737.

GODINEZ GUTIERREZ (Jacob). Tratamiento de la disenteria amibiana por el yatren 105. Tesis.—40 pp. 1927. Apr. Universidad de Guadalajara Facultad de Medicina. Mexico. Imp. "El sobre Azul" Motolinia 25.

HOSHI (N.). Kinderdysenterie von Standpunkte der Hausepidemie betrachtet.—*Oriental Jl. Dis. Infants.* 1927. July. Vol. 2. No. 2-3. German summary pp. 134-135. [In Japanese.] [Dairen Hosp., Dairen.]

IZQUIERDO SALAZAR (Alfredo D.). El yatren 105 en la disenteria amibiana. Tesis para el doctorado en medicina y cirujia.—69 pp. 1927. Bogotá. Tip. Voto Nacional.

MESSINA (Raffaele). Ameba dissenterica. Diffusione della dissenteria amebica, caratteri morfologici e culturali delle amebe, varietà delle forme amebiche. Sintomatologia, decorso, forme cliniche, complicazioni e terapia della dissenteria amebica.—*Riv. Clin. Med.* 1927. Oct. 30. Vol. 28. No. 20. pp. 798-808. [45 refs.]

LEPROSY.

DE LANGEN (C. D.) & HERMANS (E. H.). Rapport sur le problème de la lèpre. [Report on the Problem of Leprosy.]—*Acta Leidensia. (Scholae Med. Tropicae.)* 1927. Vol. 2. pp. 160-176. With 2 maps.

This is a report to the Hygiene organisation of the League of Nations, and it furnishes an interesting discussion on the methods of utilizing our present knowledge of treatment in dealing with leprosy. Maps of the world distribution of leprosy per mille and per area are given. Epidemiology is next discussed and our ignorance of the exact degrees of contagiousness and of the mode of infection is emphasized, but the authors are in agreement with the general opinion that infection probably takes place through the skin and mucous membranes, and is most often due to prolonged house contact with an infective leper; they urge, however, further investigation on these points, especially during febrile attacks. Hospital treatment to attract the patients is more important at the present time than compulsory isolation, so much relied on hitherto, for which purpose special hospitals should be organized in each infected area, so that the patients can be treated in their own districts by experts, which would also result in increasing clinical and pathological knowledge of the disease. Early cases would also be attracted with much better results of treatment.

Different systems of combating leprosy are next discussed, and the old compulsory segregation with little or no treatment is condemned. The Hawaiian plan of combining compulsory isolation with paroling recovered cases is an improvement, but is impracticable in many countries on account of the cost. The Norwegian system of largely voluntary isolation, with the treatment of well-to-do at their homes under supervision, has been effective in that country, but not so successful elsewhere. The authors advise for the Dutch East Indies the establishment of a board of three medical men in each district or group of districts to examine all persons reported to be lepers under a system of compulsory notification by all medical men, all infective cases to be sent to hospital for treatment as long as they remain diseased, but early uninfected cases should be treated at home, and inspected by the Board at regular intervals. Infants born of leper parents should be separated from them as early as possible, and certain trades interdicted to lepers. The provision of the best available treatment in the hospitals to attract the lepers is thus the key note to the modern prophylaxis of leprosy, and they advocate an international organization to study and advise on the whole subject.

L. Rogers.

BRITISH GUIANA MEDICAL ANNUAL FOR 1925. pp. 86-110. **Leprosy Supplement. Leprosy in British Guiana. Report of a Departmental Medical Conference held in Georgetown, September, 1924-May, 1925.**

FREND (G. A.). **Notes on Leprosy and its Treatment from Observations made in the Leper Asylum, Mahaica, during the Year 1923.**—*British Guiana Med. Annual 1925.* pp. 111-117.

ROSE (F. G.). **Leprosy Statistics and Legislation in British Guiana.**—*Ibid.* pp. 118-121.

The first part of an interesting description of leprosy in this Colony deals with the conclusions of a leprosy conference, which recommended

revision of the law on the subject, the formation of a board of medical experts to advise in certification, admission and discharge of lepers, and persistence in modern forms of treatment. The history of the prevalence of the disease as far as it is known is next dealt with. The results of an investigation by J. GLAVINA regarding the infectivity of the anaesthetic type of leprosy, as revealed by bacteriological examinations, gave positive results in 20 to 25 per cent. as regards the nasal mucous membrane if smears of both nostrils are examined; this affords an accurate guide to infectivity, which is greater the earlier the case. In October, 1924, the known lepers numbered 328, including released cases under supervision, and between 1906 and 1924 244 cases had been repatriated to India, and this accounts for the greater part of the reduction in the numbers during the last two decades.

Part 2 deals with treatment at the Mahaica Leper Asylum in 1923 by G. A. Frendo, who notes that the vast majority are very advanced cases, and he urges the systematic search for early cases, if the full advantages of the modern treatment are to be obtained. Moogrol intramuscularly and Harper's intravenous injections of the whole oil were used, the first being preferred. Repeated courses of six injections, one a week, have a cumulative effect, nodules were observed to soften and become absorbed, and in the few early maculo-anaesthetic cases good results are pretty constant. A card-index system of records is advised.

Part 3 by F. G. Rose gives further details of the history of leprosy in the Colony, which is well known to leprologists.

L. R.

DENNEY (O. E.). **National Leper Home (United States Marine Hospital), Carville, La. Review of the More Important Activities during the Fiscal Year ended June 30, 1927.**—*Public Health Rep.* 1928. Apr. 6. Vol. 43. No. 14. pp. 810-817. With 4 figs. on 2 plates.

"The 12-month period here reported on has been especially satisfactory in that an increasing number of patients have shown gratifying progress towards permanent arrestment of leprosy." New admissions numbered 56 and 255 remained at the end of the year. Chaulmoogra ethyl esters, augmented by the crude oil in formalized capsules orally, have been continued. Ultra-violet rays have relieved pains and healed perforating ulcers, especially rays from the carbon arc burner, and metallic applicators heated to various temperatures have had a good effect on local lesions. Work and exercise is encouraged. The Mississippi floods threatened the colony for a time and necessitated work at the levee. Everything is done in this model colony to make the patients comfortable and happy.

L. R.

ROBINEAU. La question de la lèpre au Maroc. [**Leprosy in Morocco.**]—*Rev. Méd. et Hyg. Trop.* 1928. Jan.-Feb. Vol. 20. No. 1. pp. 5-13. With 2 text figs. [2 refs.]

The number of known lepers is placed at 302, but it is recognized that the true figure is much greater, and the large majority are highly contagious active cases. Treatment with the ethyl esters of chaulmoogra oil should be the basis of prophylaxis, and all the Musulman

lepers will come for the treatment when its efficiency is shown. The author advises the segregation of infective cases on the Island of Mogador.

L. R.

COCHRANE (Robert G.). **Leprosy in Europe, the Middle and Near East and Africa.**—73 pp. 1928. London: World Dominion Press, 1, Tudor Street, E.C.4. [2s.]

This is the second leprosy survey by this authority, and it contains valuable information not easily found elsewhere. The highest number of lepers given for Europe is 702 in the Baltic countries, including Norway and Sweden. Palestine records 47, but the dry areas from Arabia to Persia have few. Notes are given regarding work on leprosy in our African Colonies, the numbers in which were estimated last year by Mr. OLDRIEVE, Secretary to the British Empire Leprosy Relief Association, at well over 150,000, and a table is appended giving the known data regarding the number of lepers and the rates per mille in the countries dealt with.

L. R.

WADE (H. W.) & RODRIGUEZ (J. N.). **A Description of Leprosy. Its Etiology, Pathology, Diagnosis and Treatment for Health Officers and Others concerned in Antileprosy Work. Prepared under the Auspices of the Culion Medical Board, Philippine Health Service.**—93 pp. With 26 figs. on 14 plates & 4 text figs. 1927. Manila: Bureau of Printing.

This is a very valuable and well illustrated description of leprosy by two of the most experienced workers in the world at the great Culion Leper Settlement in the Philippines, and it should be in the hands of all who are dealing with the disease. The first 89 pages are devoted to etiology, bacteriology and pathology, followed by an excellent clinical description with photos, while the sections on treatment include the technique of intravenous and other injections. The laws and official regulations conclude a compact work of 93 pages containing all the essentials of the subject.

L. R.

MONTERO (Aniceto). La lepra, además de ser contagiosa, es una enfermedad hereditaria? [**Is Leprosy Hereditary as well as Contagious?**]*—Abhandl. u. d. Gebiet d. Auslandskunde. Hamburg. Univ.* 1927. Vol. 26. (D., Med. & Vet. Vol. 2.) [Festschrift NOCHT.] pp. 357–360.

A female leper became pregnant; she suffered from a severe grade of the mixed form. Parturition occurred at the eighth month and the child was immediately taken away from the Asylum and was given to a healthy family and fed artificially. It was not suckled once by the mother. *Leptra bacilli* were found in the placental tissues, in the blood-clot and in the blood of the umbilical cord. The serum of the child was examined; it gave a positive Wassermann reaction and *lepra bacilli* were found in it microscopically. The infant died six weeks later with diarrhoea and generalized pemphigus, and in the fluid of the latter lesions the bacillus was also found.

The author argues that treatment of the mother leads to the bacilli having a reduced virulence which is of advantage to the offspring and that later,

when the child's defences become weakened, the disease slowly develops ; if it does not, then these defensive powers have become reinforced as life progresses. In several of his patients he has been able to show that the mother had suffered from what he calls " atypical leprosy " of short duration, becoming cured spontaneously, or being treated successfully as a case of ozaena or mild nasal affection, though the bacilli were present.

H. Harold Scott.

SITANALA (J. B.). **The Norwegian Leprosy Laws, as they are to-day in Norway, should be applied to the Dutch Indies.**—*Acta Leidensia (Scholae Med. Tropicae)*. 1927. Vol. 2. pp. 177-186.

This paper deals once more with the well known system of mild segregation measures by means of which leprosy has been reduced from nearly 3,000 cases in 1856 to 100 at the present time. He emphasizes the difficulties in treating lepers, but states " that the beginning cases are certainly curable ! An invaluable result of our modern therapy ! " He also advises health committees to help the lepers in every village, an institute for the scientific study of the disease and the establishment in Holland of a leprosy office in the spirit of the British Empire Leprosy Relief Association at London.

L. R.

PINEDA (Eloy V.). **The Presence of *Mycobacterium leprae* in the Placenta and Umbilical Cord.**—*Jl. Philippine Islands Med. Assoc.* 1928. Feb. Vol. 8. No. 2. pp. 67-70. [17 refs.] [Culion Leper Colony, Philippine Health Service.]

Previous observations on this point have been based on few cases, but the author now reports observations on 104 placentas at Culion, with positive results as regards finding acid-fast bacilli in 57, or 53 per cent. In 24 per cent. the organism was also found in the umbilical cord, showing passage through the placenta to the foetus, but in only one case was it found in the cord but not in the placenta. Both examinations of direct smears of the cut surfaces, and also preparations of the second centrifuge deposit of the pulp of the organ after passing through a press were examined, and one-fourth of the cases were only positive by the latter concentration method. In view of the great rarity of the very early development of the disease in the children of lepers, the author thinks that the organism is overcome by the tissues of the foetus in the great majority of those it reaches through the placenta, but the possibility of intrauterine infection should be considered when the disease develops in early infancy.

L. R.

ALEIXO (A.). Sobre a pesquisa dos bacillos de Hansen nas manchas. [**Search for Bacilli in Leprotic Macules.**]—*Brazil Medico*. 1927. Dec. 17. Vol. 41. No. 51. pp. 1337-1341.

This question is of importance from four different aspects : (1) For diagnosis ; (2) for determining the stage and character of the disease ; (3) for prognosis ; (4) for directing treatment.

Various methods of making the investigation have been proposed from time to time with conflicting results ; among these are simple scarification, vesication and examination of the centrifuged fluid ;

removal of a fragment of skin, triturating it in saline and centrifuging; bloodless examination by scarification of a pinched up portion at the periphery of the macula, with or without puncture. The last is recommended by the author, or a procedure of incision at the edge of a macula, squeezing the edges of the cut, scraping the subepithelial layers and spreading the material on slides.

Positive findings are more frequent when the erythematous margin is examined. Brief accounts are given of three cases of active generalized leprosy, in all of which the results were positive; of nine cases of the maculo-anaesthetic type with few symptoms, only one was positive and that after the second attempt, although in this patient examination of the nasal mucosa gave no lepra bacilli; of six cases with definite symptoms two were positive and in both of these the bacilli were present also in the nasal secretion.

H. Harold Scott.

ARCOS (G.) [**Contagion and Transmission in Leprosy.**].—*Bol. del Hosp. Civil de San Juan de Dios.* 1927. Jan. Vol. 1. p. 19. [Summarized in *Arch. Dermat. & Syph.* 1927. Dec. Vol. 16. No. 6. p. 768.]

Conjugal infections are rare, but the author met with six children of one family all infected from their leper parents. He has infected a macacus monkey with an evanescent tubercle. Affection of the genital organs may cause impotence and sterility.

L. R.

LIE (H. P.). Om leprøse karforandringer. [**Leprous Changes in the Vessels.**].—*Norsk Mag. f. Laegevidenskapen.* 1927. Nov.-Dec. Vol. 88. No. 11-12. pp. 1108-1119. With 1 text fig. [5 refs.] German summary pp. 1119-1120.

After a short historical survey the author describes leprosy changes of the peripheral vessels of the extremities in nodular leprosy. These changes, which are mostly of a sclerosing nature, affect both arteries and veins, although the latter are most often and most severely involved. The changes may be so great as to produce closure of the vessel. The tunica adventitia and intima are most severely altered, but changes also occur in the tunica media.

Leprosy bacilli are always present in the vascular walls, sometimes in large quantities. The changes may either proceed from the leprosy infiltrations in the skin, the leprosy bacilli passing through the lymph tracts along the vessels, or they may be produced by direct infection from the blood; for the bacilli can certainly pass into the blood at a very early stage of the disease either through the lymph-stream or through the walls of the capillaries or through the fine vessels.

It is strongly emphasized that no changes worth mentioning can be found in the large vessels such as the aorta, or in the vessels of the heart, brain, spinal cord, liver and spleen. In this particular there is a *fundamental difference between leprosy and syphilis*. The vascular changes may cause swelling and cyanosis of the affected parts of the skin. The author also describes vascular changes in lepra mutilans, but is of the opinion that they are probably secondary and are to be ascribed in some way or other to the destruction of the peripheral nerves.

L. R.

GOUGEROT (H.). Les formes atténuées, localisées, fixées curables de la lèpre. [**Mild Localized Curable Forms of Leprosy.**].—*Rev. Prat. Malad. des Pays Chauds*. 1927. Oct. Year 6. Vol. 7. No. 10. pp. 501-509. [4 refs.]

The author describes different types of mild localized curable leprosy, which in common with other French writers he considers to be more common than is generally held. They include cases showing a few brown anaesthetic patches, localized tubercles, and those showing a single primary tubercle on the skin, which should be removed in the hope of effecting a cure, or more rarely on the nasal mucous membrane, which should be cauterized. Another variety is the atypical nerve case, including perforating ulcers of the foot, pain or muscular wasting localized in an extremity, isolated anaesthetic pigmented patches, mucous discharge from the nose, iritis without other obvious cause, and localized orchitis. Such cases are likely to be overlooked by inexperienced workers, and they commonly yield to simple treatment by chaulmoogra oil and its derivatives and other remedies.

L. R.

- i. ARMSTRONG (C. L.). **Report of Case of Leprosy with Unusual Manifestations.**—*U.S. Veterans' Bureau Med. Bull.* 1927. Dec. Vol. 3. No. 12. pp. 1248-1252. With 2 plates.
- ii. BAYON (H. P.). **A Case of Undiagnosed Leprosy of Many Years Duration.**—*Ann. Trop. Med. & Parasit.* 1927. Dec. 31. Vol. 21. No. 4. pp. 381-384.
- iii. GOMES (J. M.). *Lepra?* (Considerações em torno de um caso clinico). (**Leprosy? Discussion of a Clinical Case.**)—*Rev. Biologia e Hyg.* São Paulo. 1927. Vol. 1. No. 2. pp. 81-85. With 1 text fig. & 1 coloured plate. [4 refs.] English summary p. 85. [Inst. of Hyg., S. Paulo, Brazil.]
- iv. DENNEY (Oswald E.) & WOOLEY (Jerald G.). **Leprosy complicated by Syphilis and Hypernephromatosis. Report of a Case.**—*New Orleans Med. & Surg. Jl.* 1928. Mar. Vol. 80. No. 9. pp. 586-589. With 6 figs. [1 ref.]
- v. NÉNON (J.). Un cas de lèpre autochtone chez un arabe nomade des Hauts-Plateaux algérois. [**Indigenous Leprosy in an Arab of the Algerian Plateau.**].—*Arch. Inst. Pasteur d'Algérie*. 1927. Dec. Vol. 5. No. 4. pp. 484-488. [8 refs.] [Saharan Lab., Pasteur Inst., Algiers.]
- vi. WHITE (Richard Joseph). **Three Cases of Leprosy in One Mexican Family.**—*Southern Med. Jl.* 1928. Apr. Vol. 21. No. 4. pp. 311-312. With 1 text fig.
- vii. PAUTRIER (L. M.). Hématomes spontanés à culture pure de bacilles de Hansen, suite probable de thrombophlébites, au cours de l'évolution d'une lèpre. [**Spontaneous Haematomata in a Leper with Pure Culture of Lepra Bacilli.**].—*Bull. Soc. Française Dermat. et Syph.* 1928. Feb. No. 2. pp. 155-157.
- viii. IHARA (Yoshisada). Ueber einen Fall von Lepra mit rein sensiblen Symptomen. [**A Case of Leprosy with Sensory Symptoms alone.**].—*Arch. f. Dermat. u. Syph.* 1928. Apr. 19. Vol. 154. No. 3. pp. 634-639. With 3 text figs. [8 refs.] [Med. Clinic, Imperial Tohoku Univ., Sendai.]

i. This is a single case in which the early signs were overlooked for six years, until an acute exacerbation occurred following debility after severe haemorrhage due to tonsillectomy.

ii. Another case presenting difficulty in diagnosis and seen by the recorder many years ago at Robben Island. Brownish red patches were for long treated as syphilis without effect, and more typical leprosy lesions developed later.

iii. A case of erythematous infiltration of the skin with acid-fast bacilli in the nose.

iv. A leper of ten years duration admitted to the Carville leper institution with the complication of syphilis, and unsuspected double hypernephromatosis of adrenals and right kidney found post-mortem.

v. A mixed case of leprosy of local occurrence in an Arab in the higher region of Algeria.

vi. Three cases of well developed infective leprosy among a family of eight Mexicans, who had resided for long in Texas without being detected, and thus were a danger to this Southern United States area.

vii. An interesting and very rare case of multiple haematoma developing in subcutaneous tissues of the limbs, probably from thrombosis of superficial veins, the aspirated broken down blood of which contained very large numbers of leprosy bacilli in pure culture. The author does not know of any similar case having been reported.

viii. A case presenting difficulties in diagnosis owing to the absence of any symptoms other than symmetrical alterations in sensation of the arms.

[The above cases emphasize the necessity of better teaching of the early signs of leprosy in our medical schools to allow early cases to be recognized and treated by medical men in the more amenable stages of the disease.]

L. R.

PETER (F. M.). Herpes zoster bei Lepra. [**Herpes Zoster in Leprosy.**]—*Dermat. Woch.* 1927. Feb. 12. Vol. 84. No. 7. pp. 220-224.

The writer describes a case of leprosy with herpes in the region of the first trigeminal branch on the left side in a leper with mainly maculo-anaesthetic lesions of two years standing, and he thinks the herpes developed in a nerve area already injured by leprosy.

L. R.

BOYD (T. C.) & ROY (A. C.). **Notes on the Cholesterol Content of Indian Blood in Health and in Leprosy.**—*Indian Jl. Med. Res.* 1928. Jan. Vol. 15. No. 3. pp. 643-651. [1 ref.]

One hundred control bloods were first tested for cholesterol by the method of Myers and Wardel and it was found to average 0.116 per 100 cc. of whole blood, and to vary between 0.082 and 0.184. Cases of leprosy from MUIR'S Calcutta clinic were then tested with an average of 0.099 and variations from 0.13 to 0.08 in 15 early cases; the average figure was 0.08 and the extremes 0.07 to 0.109 in 19 advanced skin cases, and an average of 0.096 and the variations from 0.08 to 0.109 in 10 cases after treatment. They conclude that the normal amounts of cholesterol in Indians is slightly less than in British and American observations, and that the content is reduced in the early stages of leprosy, and still more so in advanced cases, and that in the latter type it does not return to normal after treatment.

L. R.

GOMES (J. M.), LEITÃO, Filho (C. A. Pereira) & WANCOLLE (A.). Cholesterinemia na lepra. (**Cholesterol in the Blood in Cases of Leprosy.**)—*Rev. Biologia e Hyg.* São Paulo. 1927. Vol. 1. No. 2. pp. 39–52. English summary p. 53. [16 refs.] [Inst. of Hyg., S. Paulo, Brazil.]

These workers have investigated the cholesterol content of the blood in lepers of S. Paulo, Brazil, and found a reduction in proportion to the gravity of the case, and a decrease during a febrile recrudescence. Moreover, chaulmoogra oil increases the cholesterol, especially in early cases, a high figure permitting of temporary cessation of the drug to improve the patient's general condition. Patients with relatively high cholesterol rarely develop severe forms of leprosy.

L. R.

DE MARVAL (Luis). Contribución al estudio de la sangre en la lepra. [**Contribution to the Study of the Blood in Leprosy.**]—*Semana Méd.* 1928. Apr. 26. Vol. 35. No. 171 (1789). pp. 1034–1045. ["Francisco J. Muñiz" Hosp., Buenos Aires.]

The results here recorded were compiled from examination of 100 cases of leprosy of all forms in the course of a year. As regards the red corpuscles no general changes were noted; once only there was a slight anisocytosis and hypochromia. The sedimentation rate was not tested. As regards leucocytes 20 presented a leucocytosis of over 10,000 and 8 were below 5,000 per cmm. Eosinophiles were increased to between 4 and 5 in most cases, and wherever this occurred the stools were examined for helminthic infection, but such was not found. The nervous forms of leprosy gave the higher eosinophilia, namely, 6.5 per cent. Neutrophiles were about normal, relatively and absolutely; the average lymphocyte count was 23.74 per cent. Large mononuclears were increased, particularly in the maculo-anaesthetic cases where the percentage was over 8. The viscosity was a little above normal, with a slight reduction of bleeding-time. The author sums up his findings in the following words (translated): "Red cells unaltered; leucocytes normal to subnormal; eosinophilia both relative and absolute; neutrophiles and lymphocytes no change of importance; monocyte increase both relative and absolute, but to a mild degree; platelets normal."

H. Harold Scott.

UNNA, Jr. (Paul). Neuere Behandlungsmethoden der Lepra. [**Recent Methods of Treatment of Leprosy.**]—*Dermat. Woch.* 1928. Mar. 24. Vol. 86. No. 12. pp. 383–394. [12 refs.]

This is an historical review of different methods of treatment from that of UNNA senior in 1885 with pyrogallol plaster locally, through the use of antileprol by ENGEL Bey in Egypt in 1909 and of nastin by DEYCKE in the same year. A change was made when during the war ROGERS and DEAN worked out the methods of using soluble active products of chaulmoogra oil by injection, which have since been extensively adopted. Mention is also made of vaccines, X and violet rays, electric currents, salvarsan, eparsino, silver, gold, bismuth and antimony, none of which have proved of much value as compared with the chaulmoogra preparations, which he states were used in the form of the oil and as

gynocardates long ago by UNNA senior. The author's well-known treatment by the surgical removal of large nodules, together with the use of carbon dioxide snow and pyrogallol plaster or ointment, is once more described.

L. R.

HOFFMANN (W. H.). Ueber Behandlungsversuche bei der Lepra. [**Treatment of Leprosy.**]—*Dermat. Woch.* 1928. Mar. 24. Vol. 86. No. 12. pp. 394-402. [State Leper Hosp., Health Ministry, Havana.]

The author has worked for long at the Havana leper hospital with 200 cases. The chaulmoogra treatment has continued to answer well and has led to great progress, and in many cases its timely use has led to cure in the sense that the patients become free from all evident symptoms and contagion. He thinks also that the gold treatment with krysolgan has a curative effect on eye lesions. More rapid progress would result if trials of remedies could be made on infected animals. Progress is also greatly handicapped by cases coming too late for effective treatment, and the methods of early diagnosis require to be improved. The old type of leper asylum requires to be replaced by hospitals well equipped for treatment, for the cure of the disease now furnishes the only scientific basis of a prophylactic campaign against leprosy.

L. R.

DE LANGEN (C. D.). Traitement de la lèpre. [**Treatment of Leprosy.**]—*Acta Leidensia (Scholae Med. Tropicae)*. 1927. Vol. 2. pp. 143-150.

A review of the literature shows that complete cures of leprosy have been reported by various observers in from 5 to 50 per cent. of cases, but the author's experience in 102 cases in a leper hospital in the Dutch East Indies only gave 5 per cent. of recoveries under the chaulmoogra ethyl ester treatment. Only 8 were early cases with 4 cures, one of which relapsed, but recovered again with further treatment. Of 24 more advanced cases only 1 recovered and 15 showed great improvement, and of 62 advanced serious cases none were cured and only 29 were improved. Cases should be treated in hospitals, and should be detected in the early stages if good results are to be expected, since early diagnosis enormously improves the prospect of obtaining cures. He thinks that the reported failures to reproduce the disease by inoculation is because only certain stages, especially during acute febrile exacerbations of the disease, are infective.

L. R.

LARA (C. B.). **Evaluation of the Results of Treatment of Leprosy with the Chaulmoogra Derivatives.**—*Jl. Philippine Islands Med. Assoc.* 1928. Feb. Vol. 8. No. 2. pp. 56-64. [17 refs.]

The author is justified in claiming that the trial on such a large and prolonged scale as in the Culion Leper Settlement of the modern treatment by injections of the active preparations of chaulmoogra oil, permits them to draw more reliable conclusions than those of certain sceptics with very limited experience, so this paper is of exceptional value.

The effect on the public of the improved results is strikingly shown by the fact that "whereas previous to the employment of the new methods, six years ago, most of the lepers had to be captured or forcibly detained, during the last three years the great majority have presented themselves voluntarily for isolation and treatment," and "a more general and adequate appreciation of the value of the chaulmoogra preparations will be of tremendous and far-reaching importance in the eradication of the disease."

In estimating the results only bacteriologically negative or apparently cured cases are taken into account, thus affording a stringent test of the efficacy of the treatment; yet in spite of the great majority of the lepers being at an advanced stage on admission, and all bacteriologically positive, in the six years up to September, 1927, no less than 536 had been paroled or discharged as recovered, against only 47 negatives in 15 years from 1906 to 1921 in the same colony. Moreover, a further 257 negative cases are awaiting parole, and by December 31st, 1927, more than 600 will be paroled or discharged, and a total of more than 900 negatives will be credited to the present treatment, or approximately 16 per cent. of the advanced series of cases treated. These figures can leave no doubt in the mind of any medical man regarding the great advance made.

The total ethyl esters of *Hydnocarpus wightiana* oil with 0.5 per cent. iodine, in doses gradually increased from 0.5 cc. to 5 cc. intramuscularly once a week has been the preparation most generally used for an average period of 2½ years. Recently small doses have been injected beneath skin lesions with good results, especially in relapsing lesions. The conditions which mainly influence the results are that children do best, but the period of most active sexual life in the married or cohabiting couples is comparatively unfavourable, especially in males; and females do rather better than males. Of the different types the percentages of negative cases are 0.79 in cutaneous, 6.0 in mixed and 50.7 per cent. in nerve cases, partly due to the tendency of nerve affections to decline in activity after a time. Good hygiene, diet, exercise, the avoidance of sexual indulgence and pregnancy and the removal of complicating diseases, such as syphilis and helminthiasis, are all beneficial. The improvement has been greater in cases not showing reactions to the drug, and these are believed by the Culion authorities to be harmful, contrary to the opinion of Indian workers. [The latter deal mainly with earlier cases, in which reactions are safer and more beneficial.]

It is still too early to say what the ultimate results are since many of the discharged patients have not been followed up, but of those detained for 18 months to two years after becoming negative before release, only 5.1 per cent. showed any recrudescence of the disease, and three-fourths of these cleared up with further treatment, and among 74 detained for over two years, only 1.3 per cent. recurred. Altogether these large scale results fully justify the general opinion that there is now hope for the leper.

L. R.

NICOLAS (Catalino) & ROXAS-PINEDA (Elisa). **Results of Antileprosy Treatment of Children in the Culion Leper Colony.**—*Jl. Philippine Islands Med. Assoc.* 1928. Mar. Vol. 8. No. 3. pp. 135-136.

This is a valuable report on 70 confirmed cases of leprosy in children of 1½ to 15 years of age with bacteriological positive lesions for form

a few months to five or more years, treated with ethyl esters and other chaulmoogra preparations for from ten months to five years and six months, but mostly for not more than two years. Of 36 males, 18, or 50 per cent., and of 34 females, 20, or 58.8 per cent. are now negative. Of 36 early cutaneous cases 24, or 66.6 per cent. are negative, as are 3 of 4 early mixed type, so that of the 40 early cases 27, or 67.5 per cent. have become negative, but only 37 per cent. of 27 moderately advanced cases, and 1 of 3 advanced ones. The average duration of treatment was 2 years 5 months for early, 2 years 7 months for moderately advanced, and 4 years for advanced cases. Ethyl esters with 0.5 per cent. iodine were mainly used, with which in early or slightly advanced cases a large percentage of apparent cures is obtained.

L. R.

ROGERS (Leonard). **Recent Advance in the Treatment of Leprosy and its Bearing on Prophylaxis.**—*Practitioner*. 1928. Apr. 12 pp.

After a brief description of recent advances in treatment, including the use of the new form of sodium hydnocarpate called alepol, and of MUIR's iodide of potassium treatment, the results obtained in the Philippines, Hawaii and Calcutta are reviewed, showing that in Hawaii, 8 per cent. of advanced cases, 34 per cent. of moderately advanced, and 64 per cent. of early cases had recovered. The importance of attracting early cases for treatment is emphasized, and it is pointed out that with the present treatment compulsory segregation, unmodified by allowing early, for the most part uninfected, cases to be treated at home or as out-patients without isolation, may easily do more harm than good by leading the early cases to be hidden until the most favourable time for treating them is past, for in both the Philippines and in South Africa the cases obtained by compulsory segregation average from six to eight years' duration on discovery, during which they may have infected others. It is also urged that under favourable conditions, such as in Europe, by examining all the households and other close contacts of all known lepers every six months for five years, probably 80 per cent. of infections would be detected and cleared up by treatment, so that in a single decade the disease could be very greatly reduced. This plan is being adopted in several European countries, and if successful its use could gradually be extended to other areas.

L. R.

- i. ROSE (F. G.). **The Treatment of Leprosy at the Mahaica Leper Hospital, British Guiana.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1928. Mar. 31. Vol. 21. No. 6. pp. 481-488.
- ii. WALDRON (G. D. K.). **Some Notes on Moogrol in the Treatment of Leprosy.**—*West African Med. Jl.* Lagos. 1928. Jan. Vol. 1. No. 3. p. 56.
- iii. SHARP (L. E. S.). **Brief Report on Leprosy treated in Kigezi District, January 1st, 1922-December 31st, 1926.**—*Uganda Protectorate Ann. Med. & San. Rep. for the Year ended 31st December 1926.* Appendix No. VI. pp. 91-92.
- iv. HORWITZ (Philip). **A Preliminary Analysis of the Treatment of Lepers at Palo Seco with the Ethyl Esters of the Fatty Acids of Chaulmoogra Oil.**—*Proc. Med. Assoc. Isthmian Canal Zone.* 1921-1926. Vol. 14. pp. 55-59.

- v. DELANOË (E.). Essai d'un traitement mixte de la lèpre. [**A Mixed Treatment in Leprosy.**].—*Bull. Soc. Path. Exot.* 1927. Dec. 14. Vol. 20. No. 10. pp. 953-957.
 - vi. JOHANSEN (Frederick A.). **Benzocaine-Chaulmoogra Oil in the Treatment of Leprosy. Preliminary Note on the Use of an Oil-Soluble Analgesic which renders Intramuscular Injections of Chaulmoogra Oil Painless.**—*Public Health Rep.* 1927. Dec. 9. Vol. 42. No. 49. pp. 3005-3010. With 12 figs. on 5 plates.
 - vii. ROGERS (Leonard). **The Curative Action of Hydnocarpates and Iodides in Leprosy.**—*Lancet.* 1928. Jan. 14. pp. 73-74. [10 refs.]
 - viii. LABERNADIE. Trois cas de zona survenus chez des lépreux en cours de traitement. [**Occurrence of Three Cases of Herpes Zoster during Treatment for Leprosy.**].—*Bull. Soc. Française Dermat. et Syph.* 1927. Nov. No. 8. pp. 762-766.
- i. F. G. Rose reports on 175 patients who had completed a course of treatment of whom 50 had sodium morrhuate and 10 thymol without any good results, and 10 each creosoted *Hydnocarpus wightiana* oil and 10 sodium hydnocarpate with promising results; the remaining 85 were treated with ethyl esters of the same oil supplied by Smith Stanistreet & Co., of Calcutta under the name of "Hydnestryle" with 19 cured with loss of all symptoms, 39 arrested and 30 improved, while of 55 bacteriologically positive 23, or 41·8 per cent., had become negative. For ulcers zinc ionization and ultra-violet rays from a mercury vapour lamp were of great value in healing perforating ulcers of many years standing.
 - ii. Waldron in Nigeria reports on seven months' treatment of 17 lepers with injections of the chaulmoogra ethyl ester moogrol, and found undoubted considerable curative effect, but only in those cases which reacted.
 - iii. L. E. S. Sharp of the Kigezi district of Uganda reports on 59 lepers during five years, of whom 28 were treated for less than 4 months, 24 for 4 to 12 months, and only 7 for over one year. Ethyl esters were used in 53 of them by MUIR's method, but only 12 of the 50 treated for over one month showed improvement; in only one was it very striking, and even early cases failed to improve, so he suggests that the Uganda strain of leprosy is very resistant.
 - iv. P. Horwitz reports on the use of ethyl esters, on the lines of the Honolulu workers, at the Palo Seco Leper Colony in Panama, with 195 admissions since it was established in 1907. Of 65 treated cases, only 39 had been under treatment for more than five weeks, and 20 of these already showed some improvement. He considers the results to "have been very satisfactory" and the remedy to be superior to all others in leprosy, although it is too early to write with regard to the ultimate results.
 - v. E. Delanoë reports on seven women and children lepers treated by collobiase chaulmoogra, chaulmoogra oil and sodium gynocardate, together with novarsenobenzol one after the other, and his short experience leads him to think that a combination of remedies is more efficient than any one of them. Various degrees of improvement were obtained in all the cases.
 - vi. F. A. Johansen reports from the Carville Leper Colony of the United States on the addition of benzocaine to chaulmoogra oil to lessen the pain of intramuscular injections. As it is more soluble

in olive oil he recommends chaulmoogra oil 90, olive oil 10 and benzocaine 3 parts, made up by dissolving the salt in the olive oil and adding the mixture to the chaulmoogra oil warmed to 70° C. on a water bath, passing through filter paper and sterilizing at 100° C. on a water bath for one hour. Semiweekly doses at body temperature of 5 cc. into the deltoid, alternating with 8 cc. into the buttocks was the routine method. Of 24 lepers 6 showed marked, 12 moderate and 5 slight improvement within six months with very slight discomfort.

vii. Attention is drawn to the work of E. MUIR showing that the sodium hydriocarpate called alepol can be given intravenously without vein trouble by the simple expedient of drawing up about an equal quantity of blood into the dose in the syringe, and injecting the whole after mixing by rotating the syringe on its long axis. Muir's iodide treatment is also reported to have been effective in clearing up the remaining lesions after nearly all the thickening of the tissues had been removed by alepol.

viii. In three cases herpes zoster occurred during the treatment of leprosy, with chaulmoogra ethyl esters in two, and with eparseno in the third.

L. R.

ARAUJO (H. C. de Souza). Tratamento moderno da lepra. Trabalho apresentado á Oitava Conferencia Sanitaria Pan-Americana, reunida em Lima, Perú, em Outubro de 1927, e lido na Academia Nacional de Medicina, de Buenos Aires, em 22-12-1927. [**The Modern Treatment of Leprosy. Article offered to the Eighth Pan-American Health Conference.**].—30 pp. [28 refs.] 1928. [Oswaldo Cruz Inst., Rio de Janeiro.]

An interesting, though necessarily compressed, account of chaulmoogra giving the history of its use from early days to the present, naming, with brief comments, the various preparations which have from time to time been proposed for treating leprosy, and giving the constitution of each. As such it is a useful compilation.

H. Harold Scott.

SHARP (N. A. Dyce). **A New Treatment for the Leper.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1928. Jan. 31. Vol. 21. No. 4. pp. 305-308.

The author refers to the common opinion that most improvements in leprosy with the chaulmoogra preparations follow severe reactions [the Culion workers hold the contrary opinion], and ROGERS has reported two exceptional cases showing prolonged and remarkable improvement after very severe reactions, while any value of HASSON'S vaccine treatment appears to be due to protein shock. These considerations led the author to try intravenous injections of 0.5 cc. of sterile tinned milkmaid brand or Ideal milk, diluted with 9 parts of distilled water, injected slowly into a vein as the most simple protein shock method available in the tropics. It produced in a few minutes giddiness, precordial pain with imperceptible pulse, respiratory distress with irritable cough, intense pain in the head, back and joints, and profuse perspiration, followed by a temperature of 103° to 104° F. All the

serious symptoms were recovered from in about 48 hours, and remarkable improvement in the way of cessation of pains, healing of perforating ulcers or absorption of nodules was seen in some advanced cases, and four out of twelve treated were followed up for as long as five months, and showed definite benefit, and two were able to resume manual work. He concludes: "This treatment, which is admittedly drastic and undoubtedly dangerous, seems to be applicable to the late and more hopeless forms of the disease." "Whether it would be of service in the early cases of childhood has yet to be determined. Probably, it would prove decidedly harmful." "Desperate remedies are sanctioned by desperate cases," so he commends this plan to the notice of medical men in charge of leper camps.

L. R.

EUBANAS (Froilan). **Observations on Five Cases of Leprosy treated with Javanin.**—*Jl. Philippine Islands Med. Assoc.* 1927. Nov. Vol. 7. No. 11. pp. 407-410. [5 refs.]

This Java preparation is said to be a protein-lipoid-insulin-free pig or beef pancreatic extract, which is claimed to raise the amount of fatty acids in the blood and to accelerate the action of lipase *in vitro*. In five cases treated by a series of 3 cc. subcutaneous injections totalling from 75 to 135 cc. in about three months, no appreciable benefit was noted, although a marked increase in the serum esterase was observed.

L. R.

MUIR (E.) & CHATTERJI (S. P.). **A Preliminary Note on the Use of Ephedrine in Leprosy.**—*Indian Med. Gaz.* 1928. Apr. Vol. 63. No. 4. pp. 198-199.

Adrenalin had been found to relieve the nerve pains in leprosy when used in febrile reactions, and the authors now report thirteen cases in which ephedrine sulphate, in doses of 0.05 to 0.1 gram in hard gelatine capsules orally, produced similar relief within one hour and lasting for 12 to 24 or more hours. In pains produced by iodides the same relief is afforded by taking a dose as soon as the pain commences, and it also appears to lessen the severity of the reactions after iodides, and has not the drawbacks of such drugs as opium. It appears to act by contracting the arterioles of the nerve trunks.

L. R.

FELDT (Adolf). **Die Goldbehandlung der Lepra. Zugleich Beitrag zum Grundproblem der Chemotherapie.** [**The Gold Treatment of Leprosy.**]—*Klin. Woch.* 1928. Jan. 8. Vol. 7. No. 2. pp. 73-77. [66 refs.]

The work of others on this method is discussed, and the author concludes that the various gold preparations used for leprosy since 1914, including aurocantha, gold potassium cyanate, krysolgan and solganol, act by stimulating the natural defensive processes of the body through the reticulo-endothelium, and thus excite the natural healing powers.

L. R.

PEYRE (E. L.). Posologie de l'antigène méthylique tuberculeux et son emploi dans la lèpre. [**Dosage of Methylic Antigen and its Use in Leprosy.**—*Bull. Soc. Path. Exot.* 1928. Jan. 11. Vol. 21. No. 1. pp. 14-15.]

Two cases of leprosy were treated for about two months only by this preparation (Nègre and Boquet) without material benefit, but longer trials are suggested.

L. R.

CRUZ (M. C.). **Ultraviolet Rays as Adjuvant in the Treatment of Leprosy.**—*Jl. Philippine Islands Med. Assoc.* 1928. Mar. Vol. 8. No. 3. p. 134.

Thirty-four lepers on chaulmoogra ethyl esters also received local exposures to ultra-violet rays from a quartz mercury vapour lamp over a period of eleven months, with a total time exposure of from 15 minutes to 18 hours, and for from 1 minute to two hours at a time. In closed lesions only temporary erythema without benefit resulted and trophic ulcers showed little or no reaction and they did not heal better than under other methods, so the results were nil.

L. R.

OTERO (Pablo Morales). **The Wassermann Reaction in Leprosy. A Survey of Forty-Two Cases of Leprosy isolated at the Insular Leprosarium. Preliminary Report.**—*Porto Rico Health Rev.* Vol. 2. Nos. 5, 6 & 7 & *Porto Rico Rev. of Public Health & Trop. Med.* 1927. Vol. 3. No. 5. 25 pp. With 4 figs. [23 refs.]

Forty-two lepers have been examined in Porto Rico with the Wassermann, Kolmer and Kahn tests; the author found a larger number complicated by syphilis than he had suspected, and that the Kahn test gave fewer positive reactions than the other methods, but that some uncomplicated leprosy cases do give positive reactions, especially during febrile lepra exacerbations. He also examined the cerebro-spinal fluid in 33 lepers, and found it to be normal and to give a negative Wassermann reaction, and also to be free from acid-fast bacilli.

L. R.

GIRARD (G.) & ROBIC (J.). Le réaction d'opacification de Meinicke dans la lèpre. Comparaison avec le Wassermann. [**Meinicke and Wassermann Reactions in Leprosy.**—*Bull. Soc. Path. Exot.* 1928. Mar. 14. Vol. 21. No. 3. pp. 187-190. [3 refs.] [Pasteur Inst., Tananarive.]

The opacity test of Meinicke with the technique of Mutermilch has been used, together with the tests of Calmette and of Hecht, on 300 adults and 49 children of from 6 to 16 years of age and on 30 healthy children and 280 adult controls, all at the Pasteur Institute of Tananarive. They concluded that the first named test gave reactions in a certain number of syphilis free lepers, and that it did not enable the presence of that complication to be decided.

L. R.

LABERNADIE (V.) & ANDRÉ (Z.). *Recherches sérologiques dans la lèpre. (Réactions de Matefy, de Wassermann). [Serological Researches in Leprosy.]—Bull. Soc. Path. Exot.* 1927. Dec. 14. Vol. 20. No. 10. pp. 950-952. [5 refs.] [Bact. Lab., Pondicherry, French India.]

The reactions of Matefy proved of no practical value in the diagnosis of leprosy, and the Wassermann reaction was not more often positive in lepers than in the general hospital patients of Pondicherry.

L. R.

GREVAL (S. D. S.). **Kahn, Microkahn and Wassermann in Leprosy.**—*Indian J. Med. Res.* 1928. Jan. Vol. 15. No. 3. pp. 683-686. [13 refs.]

The author has carried out these three tests in 112 lepers and an equal number of syphilitic suspects, with the result that the Wassermann reactions were almost identical in the two series; the Kahn one showed a reduction in the positive rates in both series, but slightly less so in the lepers. He therefore is unable to agree with LLOYD, MUIR and MITRA, and PINEDA and ROXAS that the Kahn test is a more reliable one in excluding syphilis in leprosy.

L. R.

PEYRE (Edouard). *Les réactions de fixation dans la lèpre. [Fixation Reactions in Leprosy.]—Rev. Prat. Malad. des Pays Chauds.* 1927. Oct. Year 6. Vol. 7. No. 10. pp. 522-527.

The writer discusses the very variable results obtained by different workers with complement fixation tests in leprosy. He attributes them to the complicated nature of the blood changes in leprosy, and suggests methods of preliminary treatments of the sera to lessen these difficulties.

L. R.

JONES (Edgar) & TIRRILL, Jr. (W. O.). **Studies on Acid-Fast Micro-organisms. I. The Reactions of the White Blood Cells of the Rabbit following Inoculation with Leprosy Bacilli.**—*Amer. Rev. Tuberculosis.* 1928. May. Vol. 17. No. 5. pp. 522-536. With 5 charts. [33 refs.] [Dept. of Anat., Vanderbilt Univ. School of Medicine, Nashville, Tennessee.]

The authors have worked on the mechanism of stimulation by injections of an acid-fast bacillus (leprosy bacillus 365 of the Washington Hygienic laboratory), on the lines of the investigations by CUNNINGHAM and others regarding tubercle bacilli in rabbits, which showed an increase of the monocytes and a decrease of the lymphocytes with the progress of the disease. They also used rabbits and found a very temporary increase in both monocytes and lymphocytes following the injection of the acid-fast bacillus used, and no infection of the animals was obtained, so they consider that the large amounts of bacteria injected caused a temporary stimulation of the haematopoietic tissues of the animals.

L. R.

KEDROWSKY (W. J.). **The Microbiology of Leprosy Bacillus.**—*Jl. Trop. Med. & Hyg.* 1928. Jan. 16. Vol. 31. No. 2. pp. 17-21. [15 refs.] [Trop. Inst., Moscow.]

In this interesting paper the author first reiterates the claims of himself and others to have cultivated the lepra bacillus, and goes on to describe his recent work on the subject, which has led him to the conclusion that the organisms exist in three very different forms. Firstly, the acid-fast type, which grows readily on culture media; secondly, the non-acid-fast diphtheroid found by many workers at this vexed question; and thirdly, a more complicated actinomycosis form, the two latter appearing when the culture media are less nutritive in nature. In these respects it closely resembles the forms described in the case of the closely allied tubercle bacillus, and he thinks that both should be placed in the group of actinomyces or streptothrices-like microbes. He hopes later to publish a more detailed account of his last four years' work.

L. R.

ARAUJO (Oscar Silva). A proposito da reacção de Botelho. Seu ensaio na lepra. [**Botelho's Reaction in Leprosy.**]—*Folha Med.* 1928. Apr. 5. Vol. 9. No. 10. pp. 120-123.

By far the greater part of this paper is devoted to the question of Botelho's reaction in cancer, that of leprosy being mentioned only in the final paragraphs. Fifty cases of this disease were tested, 27 of the mixed form, 13 of the nodular, and 10 anaesthetic. Twelve of the first, nine of the second, and four of the third gave positive results. Taking all these forms together, therefore, it will be seen that exactly half were positive, so that its value as a diagnostic sign is nil.

H. Harold Scott.

GRAHAM (J. D.). La lutte contre la lèpre dans l'Inde Britannique. [**Anti-Leprosy Measures in British India.**]—*Bull. Office Internat. d'Hyg. Publique.* 1927. Nov. Vol. 19. No. 11. pp. 1632-1633.

This is a brief report on the progress of the campaign in India during 1926, and includes trials of avenyl dissolved in chaulmoogra oil preparations in cases complicated with syphilis, with the result of rendering the Wassermann reaction negative. It records also a great extension of the work of the Indian branch of the British Empire Leprosy Relief Association.

L. R.

LUIS CARRERA (José). La lucha contra la lepra en la república Argentina. Resultados obtenidos con los tratamientos modernos. [**The Campaign against Leprosy in the Argentine. The Results of Modern Methods of Treatment.**]—*Rev. Méd. de Barcelona.* 1928. Jan. Year 5. Vol. 9. No. 49. pp. 51-65.

After reviewing the question of leprosy in general in the Argentine during the last 30 years, a matter which has been dealt with again and

again in this *Bulletin*, the author places on record the results of the various remedies which have been proposed in recent years, such as injections of bismuth, tartar emetic intravenously (30 injections each of 0.1 gm. in 10 cc.), neosalvarsan, eparseno, mercurochrome in larger doses (the only result of which was a severe stomatitis), thiosulphate of gold, etc. These were employed in a very few cases only, some half a dozen, but in none was any benefit obtained. Cod-liver oil with thymol (Hamzah's formula) produced improvement but was inferior to chaulmoogra. Heiser's method with resorcin, camphor and chaulmoogra, caused much pain and gave no relief, though in one case 36 doses were given in 13 months, with a maximum of 20 cc., and a total of more than 500 cc.

The most satisfactory has been the ethyl esters of chaulmoogra injected intravenously, intramuscularly, or by both routes together. The first yielded better results than the second, but the third was best of all. Only 10 patients were treated by the intramuscular alone, and 9 by the intravenous, but the author considers that the latter is preferable for the young and robust, with the disease recently acquired and uncomplicated, and for those who respond to intramuscular injection by intense local reaction. The double route has been used in five cases, three nodular and one each of the nervous and mixed types. Hasson's injection, containing in 2 cc. 15,000 million *Ps. pyocyanea* and 5,000 million Hansen's bacilli, was given to two patients, using $\frac{3}{4}$ of an ampoule intramuscularly and $\frac{1}{4}$ intravenously, 20 injections at three-day intervals, with distinct clinical improvement.

H. Harold Scott.

MUIR (E.) & HENDERSON (John M.). **Rat Leprosy. A Record of Experimental Work carried on at the School of Tropical Medicine and Hygiene, Calcutta, between October 1925 and August 1927.**—*Indian Jl. Med. Res.* 1928. Jan. Vol. 15. No. 3. pp. 807–817. [10 refs.]

Further experiments are reported, from which the authors conclude that rats can be infected readily with rat leprosy by either scarification or subcutaneous or intraperitoneal inoculation, and occasionally only by feeding, but with a longer incubation period. Vitamin deficient diets do not increase the virulence, and the bacillus is killed at 60° C. in 25 minutes. Monkeys, rabbits and the Chinese hamster could not be infected with rat leprosy, and human leprosy material failed to infect rats, Chinese hamsters, or Japanese dancing mice. Calmette's B.C.G. culture had no effect in protecting rats against infection with rat leprosy.

L. R.

PINEDA (Eloy V.). **On the Persistence of *Mycobacterium leprae* in the Negative Leper.**—*Jl. Philippine Islands Med. Assoc.* 1928. Feb. Vol. 8. No. 2. pp. 65–67. [Culion Leper Colony, Philippine Health Service.]

This paper deals with the same work as the paper by the same author reviewed in this *Bulletin* of November, 1927, p. 908.

L. R.

- ARAUJO (H. C. de Souza). O problema da lepra no Prata.—*Sciencia Med.* 1928. Feb. Vol. 6. No. 2. pp. 79-85.
- BALIÑA (Pedro L.). Incidencias diagnósticas en un caso de lepra nerviosa.—*Semana Méd.* 1928. Feb. 9. Vol. 35. No. 6 (1778). pp. 313-316. With 1 text fig.
- HOFFMANN (W. H.). Ueber eine allergische Reaktion bei der Lepra.—*Muench. Med. Woch.* 1926. July 30. Vol. 73. No. 31. pp. 1269-1270.
- HOFFMANN (W. H.). Neue Aufgaben der Leprabekämpfung.—*Klin. Woch.* 1926. Oct. 15. Vol. 5. No. 42. pp. 1983-1984.
- LANCET. 1928. Apr. 14. p. 792. With 1 text fig.—Leprosy in Iceland.
- PUEENTE (José J.) & PIERINI (Luis E.). Algo mas sobre bismutoterapia en la lepra.—*Semana Méd.* 1928. Jan. 5. Vol. 35. No. 1(1773). pp. 52-53.
- READ (B. E.). Is it possible to develop a Tolerance to Chaulmoogra Oil? Metabolism Studies with Rabbits and Dogs.—*Far Eastern Assoc. Trop. Med Trans. Sixth Biennial Congress, Tokyo* 1925. Vol. 1. pp. 1015-1022 With 1 chart in text. [8 refs.]

YAWS AND SYPHILIS.

MANSON-BAHR (P. H.). **Yaws.**—*Brit. Jl. Ven. Dis.* 1928. Jan. Vol. 4. No. 1. pp. 44-54. With 3 text figs.

STANNUS (Hugh S.). **Yaws and Syphilis.**—*Ibid.* pp. 55-63.

Dr. Manson-Bahr dealt with the history, distribution, etiology, symptomatology and treatment of yaws together with the differential diagnosis from syphilis, and referred to the interesting conditions still of rather uncertain etiology, gangosa, goundou and juxta-articular nodules.

Dr. Stannus then reviewed the present state of our knowledge upon the viruses of yaws and syphilis in their relation to one another, including the supposed immunity to syphilis presented by some yaws-ridden populations and alluded to recent experimental work. A number of interesting points concerning clinical syphilis in indigenous races were brought forward and criticism made upon the clinical nomenclature in yaws and upon present methods of treatment.

Both speakers referred to a number of points requiring elucidation and to the urgent necessity for further and more intense research into yaws and its relation to syphilis. In the discussion Dr. CHESTERMAN referred to yaws in Belgian Congo, Dr. HANSHELL related two cases who having had yaws, developed syphilis, Dr. Wilfred FOX dealt with the histology of yaws, and Colonel HARRISON emphasized the opener's pleading for further research and pointed out the necessity of such experimental work being most carefully planned to avoid numerous pitfalls.

H. S. Stannus.

RITCHIE (T. Russell). **Yaws.**—*Med. Jl. Australia.* 1927. Nov. 19. Supplement No. 13. pp. 401-402.

A short article from the pen of the Chief Health Officer, Samoa, mentioning the anti-yaws campaign being there carried on. He emphasizes points already made by other writers. Yaws attacked every child before the age of two years and caused both directly and indirectly much of the mortality among them. Primary and secondary lesions were never seen in adults. The natives resisted treatment of the children as they believed it would "drive the disease in" with detrimental results. Syphilis is said to be practically unknown among Samoans, and it is believed that yaws in childhood protects against syphilis. A systematic campaign against yaws was commenced in 1923, when 32,366 injections of N.A.B. were given; in 1924, 21,200, in 1925, 12,000, and for the first six months of 1926 just over 4,000. Three treatments at weekly intervals constitutes the course now given to all early cases with 10 per cent. of relapses. The author states that cure of every case is not aimed at, since if all the adult tertiary cases were treated they would lose their immunity and become liable to second attacks, until such time as all primary and secondary infections have been reduced to a negligible number.

H. S. S.

VAN DRIEL (B. M.). **Note on Framboesia in Sumatra.**—*Philippine Jl. Sci.* 1927. Oct. Vol. 34. No. 2. pp. 205-206.

In the *Philippine Journal of Science* for August 1926, a statement by WINCKEL is quoted by LOPEZ-RIZAL and SELLARDS to the effect

that "in Sumatra many cases (of yaws) are found at a height of 3,000 feet." Van Driel now writes to correct this statement, mentioning that WINCKEL had no personal knowledge of the country (the Batak plateau). Van Driel maintains, from some years of experience, that yaws is rare at this altitude in Sumatra as in Java, but found among the Karo Bataks at lower levels up to 100 metres above sea level.

H. S. S.

MAASS (Edgar). Die Framboesie im nordwestlichen Hinterland Liberias und ihre Behandlung mit Bismogenol. [**Yaws in the Northwest Hinterland of Liberia.**].—*Arch. f. Schiffs- u. Trop.-Hyg.* 1928. May. Vol. 32. No. 5. pp. 221-229. [8 refs.]

— Notes on Rhinopharyngitis Mutilans.—*Jl. Trop. Med. & Hyg.* 1928. May 1. Vol. 31. No. 9. pp. 102-103. With 2 text figs. [2 refs.] [Mission Hosp., Bolahun Liberian Mission, Order of the Holy Cross.]

The author writing from the north-western part of Liberia, where the population is heavily infected with yaws, has found rhinopharyngitis mutilans very common. It occurred in 1 per cent. of yaws cases seen. Response to treatment with bismogenol was very satisfactory. Syphilis in this area is said to be absent; only two cases, infected on the coast, were seen. The conclusion is reached that the affection under consideration is a manifestation of yaws.

H. S. S.

NAIR (T. D.). **A Tana River Yaws Campaign.**—*Kenya & East African Med. Jl.* 1927. Oct. Vol. 4. No. 7. pp. 201-207. [1 ref.]

Some account of an anti-yaws campaign in the Tana river valley in Kenya by Assistant Surgeon Nair. Twenty-five per cent. of the population of 11,748 received treatment by two (in some cases three) injections of sodium potassium bismuth tartrate at weekly intervals. Very few primary cases were seen and secondaries for the most part only among children. Among the tertiary lesions noted were all the usual manifestations. A number of cases of juxta-articular nodules were observed, some of gangosa and two cases of goundou.

H. S. S.

PEÑA CHAVARRIA (A.). Apuntes para el estudio de la Geografía Médica de la Framboesia en la República de Colombia. [**The Medical Geography of Yaws in Colombia.**].—*Abhandl. a. d. Gebiet d. Auslandskunde. Hamburg. Univ.* 1927. Vol. 26. (D., Med. & Vet. Vol. 2). [Festschrift NOCHT.] pp. 57-61. With 1 map in text & 2 figs. on 1 plate.

Yaws was introduced into Colombia from Africa in 1525, and is now very widespread. Its distribution is heaviest along the rivers and on the coasts. MANSON-BAHR is quoted to refute the prevalent idea that yaws is very rare at heights of 300 metres above sea-level, the disease being found at 1,500 metres.

H. Harold Scott.

AYUYAO (Conrado D.). **Tertiary Manifestations of Yaws in the Nose and Throat in the Philippine Islands.**—*Jl. Philippine Islands Med. Assoc.* 1928. Nov. Vol. 7. No. 11. pp. 411-416. [College of Med., Univ. of the Philippines.]

A study of 62 cases ; 32 males, 30 females ; with age incidence in decades—1st 2 cases, 2nd 18 cases, 3rd 28 cases, 4th 5 cases, 5th 5 cases, 6th 4 cases. Of the 62 cases, all of whom came from yaws areas, 47 gave a history of yaws ; in 12 cases with uncertain history all showed signs of the disease ; in 2 yaws denied and no signs discovered. W.R. + + + + in 3, + + + in 8, + + in 25, + in 18, — in 8. The author believes that the initial lesion occurs in the nose rather to the exclusion of the pharynx, though, of course, the pharynx or larynx may be primarily involved. In incipient cases the patients complained of "itching with deep-seated pain about the inside of the nose, dull in character, accompanied by a sensation of dryness." "On examination the mucosa of the nasal septum and the turbinals appeared to be moderately congested with sandlike granulations which were dry in appearance." No discharge. "There was hyperaesthesia [sic] for the patient seemed not to feel a tickling sensation when touched in that part of the nose." Infiltration progresses causing nasal obstruction and some swelling about the bridge of the nose externally. Ulceration follows with mucopurulent, sometimes foul, discharge and bleeding, and later destruction of cartilage and bone begins producing the characteristic picture of gangosa. Satisfactory results were obtained with neosalvarsan, the progress of the lesion was checked and healing took place.

H. S. S.

POLAK (H. J.). Ernste Knochen- und Gelenksveränderungen bei tertiärer Framboesie. [**Grave Changes in Bones and Joints in Tertiary Yaws.**]—*Arch. f. Schiffs- u. Trop. -Hyg.* 1927. Nov. Vol. 31. No. 11. pp. 530-536. With 8 text figs. [Military Hosp., Mageland, Java.]

Some observations on tertiary manifestations of yaws in Java and on the difficulty in making a diagnosis between these and tertiary syphilis except on the history of the case, and on X-ray examination when the rarification of bone seen in framboesial lesions contrasts with the thickening and sclerosis in syphilis. In this connexion the author points out, however, that in congenital syphilis a rather similar rarification may occur which is difficult to distinguish from tertiary yaws in a child infected when an infant.

H. S. S.

SCHÖBL (Otto). **Note on Local Terminology of Certain Manifestations of Yaws.**—*Philippine Jl. Sci.* 1928. Feb. Vol. 35. No. 2. pp. 127-132. [10 refs.]

[In summarizing the numerous papers on yaws from various parts of the world the reviewer has experienced, as, indeed, must other readers, some difficulty in interpreting the terms used by different writers. The growing need for a systematized description of the clinical lesions in yaws based on their underlying pathology was emphasized in a recent discussion (*Brit. Jl. Ven. Dis.*, Vol. iv, No. 1, 1928)].

An article by Schöbl, SELLARDS and LACY was summarized in this *Bulletin* (Vol. 24, p. 300). The present article is a criticism of that summary. Terms had been used and references made which had led to misinterpretation. It has had the happy result, however, of drawing from Schöbl a much clearer account of some of the interesting skin lesions he described in an article which everyone interested in yaws should read. He clears up the ambiguity in reference to the term "clavos" which obviously should never be used in medical literature, since it refers to three different lesions.

It is not possible to say more here as it would otherwise involve a long discussion upon most of the skin manifestations of yaws.

H. S. S.

- i. WILLIAMS (G. A.). **A Report on Cerebral Symptoms in a Case of Yaws in a Male African.**—*Tanganyika Territory. Ann. Med. & San. Rep. for the Year ending 31st December, 1926.* pp. 105-106.
- ii. CORSON (J. F.). **Extract from the Annual Report on Yaws and Syphilis.**—*Ibid.* pp. 109-110.
- iii. GRAHAM (J. W.). **Clinical Summary of 559 Cases of Yaws treated.**—*Ibid.* pp. 119-126.
- iv. TANGANYIKA TERRITORY ANNUAL MEDICAL & SANITARY REPORT FOR THE YEAR ENDING 31ST DECEMBER, 1926. pp. 131-132.—**Differential Diagnosis of Yaws (Tertiary) and Syphilis (Tertiary). Some Doubtful or Interesting Cases.**

i. Report of the case of a native who developed, a week after the last of three intra-muscular injections of bismuth sodium tartrate for florid secondary yaws, cerebral symptoms with coma and died twelve days later.

Post-mortem examination revealed lateral sinus thrombosis and "changes in the brain similar to those found in G.P.I." was reported by the director of the Pathological Laboratory to whom this organ was sent. No other lesions found in the body, no thrombosis of veins in buttock or abdomen. [No relationship was therefore established between the pathological lesions found and the disease and treatment which the patient suffered.]

ii. A statistical report containing no new facts of interest. The report loses value owing to the rather loose method adopted for dividing up the cases: thus cases of syphilis are shown under "primary," "secondary" and "tertiary," "congenital," "condylomata," with no mention of the inherited disease. Again it is stated that "as well as venereal diseases injections [bis. sod. pot. tart.] were given also in the following diseases: Tabes, psoriasis, skin diseases, periostitis, glossitis, paralysis, epilepsy." [Surely many of these were syphilitic or framboesial in origin.]

iii. An analysis of 559 cases classified as to nature of lesion distribution, with relative frequency of symptoms, etc. The figures resemble very much those which have been published before on yaws in East Africa. Juxta-articular nodules and gangosa are noted, but no cases of goundou were seen.

iv. A report on eight cases showing some of the difficulties encountered in differential diagnosis which are always to be met with in dealing with these diseases in natives.

H. S. S.

SCHLOSSBERGER (H.). Syphilis und Frambösie bei Mäusen. [**Syphilis and Yaws in Mice.**]—*Cent. f. Bakt. I. Abt. Orig.* 1927. Vol. 104. No. 1-4. pp. 237-239. [2 refs.]

The author previously showed that a mouse inoculated four months before with portions of a chancre from a syphilitic rabbit developed a latent syphilitic infection, i.e., showed no symptoms, but inoculation of portions of its lymphatic glands into rabbits resulted in infection. More recently he has extended these experiments and inoculated mice with other strains of syphilitic virus and with a strain of *T. pertenue* from NICHOLS. A piece of a sore from an infected rabbit was buried in a skin pouch on the mouse's back. This became absorbed in three weeks. No symptoms or signs developed but the mice could be shown ten months later to possess a latent infection. Later the mice were killed and blood and portions of their organs, gland, spleen and brain, were injected into rabbits by the intratesticular route. Blood was always followed by negative results, gland and spleen gave positive infections, and in the case of two syphilitic and two framboesial latent infections in the mice their brain tissue inoculations into rabbits were followed by positive results. He points out that it will now be possible to test antisymphilitic remedies on infections of the central nervous system in animals.

H. S. S.

MANTEUFEL (P.) & HERZBERG (K.). Beiträge zur experimentellen Syphilisforschung. Mitteilung F. Kaninchen-Framboesie. [**Experimental Work on Syphilis and Yaws.**]—*Abhandl. a.d. Gebiet d. Auslandskunde. Hamburg. Univ.* 1927. Vol. 26. (D., Med. & Vet. Vol. 2.) [Festschrift NOCHT.] pp. 278-285. [14 refs.] [Reich Health Office, Berlin-Dahlem & Hyg. Inst., Acad. of Med. Düsseldorf.]

A short summary of the more recent work in the differentiation of the virus of yaws and syphilis by animal experimental inoculation. Reference is made to observations by NICHOLS, BROWN and PEARCE, JAHNEL and LANGE, REASONER, IKEGAMI, MATSUMOTO and TAKASAKI [already dealt with in this *Bulletin*] and to their own experiments with a yaws virus supplied by JAHNEL, originally obtained from NICHOLS. Attention is called to the want of uniformity in the results of different workers in many cases and to the necessity of gaining an insight into the causes at work. The conclusion is reached that so far, there is no certainty as to the unity or duality of the viruses of the two diseases.

H. S. S.

CHESTERMAN (Clement C.) & TODD (Kenneth W.). **Clinical Studies with Organic Arsenic Derivatives in Human Trypanosomiasis and Yaws.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1927. Nov. 25. Vol. 21. No. 3. pp. 227-232. [2 refs.]

The use of stovarsol is well known in yaws. Cyclosan is too toxic to be used. Ditroposan is too painful for subcutaneous injection and acts slowly; it therefore possesses no advantages over stovarsol. Halarsol (oxy-amino-phenyl-dichlorarsine) on the other hand has

proved extraordinarily potent in yaws. It is administered in doses of 0.5 to 1.0 cc. (=0.250 gm.) intra-muscularly or subcutaneously, two to three injections at three to four-day intervals.

H. S. S.

LANGERON (Jean). Pian et bismuth. [**Yaws and Bismuth.**]*—Bull. Méd. du Katanga.* 1927. Aug. Vol. 4. No. 2. pp. 48-50.

The author, while enthusiastic as to the immediate result of treatment of yaws by bismuth preparations, is of opinion that these do not take the place of arsenicals when cure with negative W.R. is aimed at. Bismuth and its salts may be looked upon as valuable adjuvants in the treatment, but their curative dose he considers lies too close to their toxic dose. Cases of return of the secondary eruption and also cases of resistance to bismuth have been met with.

H. S. S.

VAN HOORDE. Quelques cas de pian traités à l'aide d'injections intramusculaires de sous-nitrate de bismuth. [**Yaws treated by Intramuscular Injections of Bismuth Subnitrate.**]*—Bull. Méd. du Katanga.* 1927. Oct. Vol. 4. No. 3. pp. 104-106.

A short note on the good results obtained in the treatment of a series of cases of yaws at the Prince Leopold Hospital, Elisabethville, by four weekly intramuscular injections of a 10 per cent. oily suspension of bismuth subnitrate, 4 cc. at a dose in the buttock. Little pain or induration occurred and only in a single case was gingivitis produced, while on the other hand lesions cleared quickly, and the B.-W. reaction was favourably influenced.

H. S. S.

BOUFFARD (G.). Traitement du pian par le stovarsol. [**Treatment of Yaws by Stovarsol.**]*—Bull. Soc. Path. Exot.* 1927. Nov. 9. Vol. 20. No. 9. pp. 841-843.

Working on the Ivory Coast, the author, who believes that in stovarsol we have by far the most satisfactory remedy for yaws in young children, and speaks with the experience gained with 3,000 cases in 1925 and more than double that number in 1926, insists that the doses which have hitherto been used are insufficient. For infants and young children three tablets on each of two successive days is advised. Between the ages of eight and fifteen years four tablets on two days are necessary, after fifteen years four tablets for three days. He finds that relapse only occurred in 5 per cent., that resistant cases are rare, but that stovarsol even after prolonged courses has no influence on goundou.

H. S. S.

VAN NITSSEN (R.). Traitement du pian par le tréparsol. [**Treatment of Yaws by Treparsol.**]*—Ann. Soc. Belge de Méd. Trop.* 1927. Nov. Vol. 7. No. 2. pp. 175-176. [6 refs.]

Unable to find any reference to the use of treparsol in the treatment of yaws the author gave it a trial among twelve adult natives. It

was given by mouth in tablet form $\frac{1}{4}$ -1 gm. per day for the first four days in two successive or more weeks. The amount necessary for clinical cure varied from 4 to 15 grams.

H. S. S.

KOBER (Philip Adolph). **The Preparation of Potassium and Sodium Tetrabismuth Tartrates.**—*Jl. Lab. & Clin. Med.* 1927. July. Vol. 12. No. 10. pp. 962-967. [6 refs.]

Starting from the hypothesis that "the value of bismuth therapy in syphilis as shown by COLE, FARMER and MISKDJIAN depends upon the solubility and speed of absorption of the bismuth preparation used," the author set out to prepare compounds of bismuth and tartaric acid which would be more soluble than those at the present time in use. Two new compounds, sodium tetrabismuth tartrate and potassium tetrabismuth tartrate, are described having these properties; they are also less toxic; their mode of preparation is given at length.

Those interested will consult the original paper.

H. S. S.

SANNICANDRO (Giuseppe). Le nodosita juxta-articolari di Jeanselme. Etiologia, clinica, anatomia patologica. [**Juxta-Articular Nodules. Their Aetiology, Signs, and Pathology.**]—*Giorn. Ital. di Dermat. e Sifil.* 1927. Oct. Vol. 68. Year 62. No. 5. pp. 1418-1432. With 8 figs. on 2 plates. [3 refs.] [Dermo-Syph. Clinic, Univ., Bari.]

After reference to this well known condition as seen in natives, the author recounts those cases which have occurred in whites, both those who have been abroad and those who have not, and discusses the etiology put forward in each case. [These have all been mentioned in this *Bulletin*.] He then relates a case coming under his own notice. A male aged 48, who ten years after contracting syphilis in youth, noticed a swelling in the neighbourhood of the left knee, followed later by others about the right knee, the elbows and left shoulder. These had typical characteristics. The W.R. was positive and there was slight dilatation of the aorta; otherwise clinical examination was negative. There follows a report on the histological examination of an excised nodule and a discussion of the pathological anatomy without any new facts being produced, but for the Italian reader the paper forms a valuable summary of this interesting affection.

H. S. S.

ZIEMANN (Hans). Beitrag zur "Gundu-Frage" bei Affen und Menschen. [**Goundou in Man and Monkey.**]—*Abhandl. a.d. Gebiet d. Auslandskunde. Hamburg. Univ.* 1927. Vol. 26. (D., Med. & Vet. Vol. 2.) [Festschrift NOCHT.] pp. 618-627. With 3 figs. on 1 plate. [26 refs.]

An interesting article discussing the various theories on the etiology of goundou and the possible relationship of that condition with the similar condition recorded by various observers as occurring in anthropoids, with a full account of the chimpanzee Sultan which remained under the author's observation from 1920 till its death in March 1923.

[The references are full and the bibliography a useful one; all interested in goundou and the osteitic changes in other bones, sometimes found associated with the paranasal swellings in man and monkeys, should consult the original article.]

H. S. S.

SCHÖBL (Otto). **Immunity in Yaws.**—*Jl. Philippine Islands Med. Assoc.* 1928. Jan. Vol. 8. No. 1. pp. 6-10.

A report on the results obtained by intradermal inoculation of yaws material into a local monkey by the Director of the Laboratory Bureau of Science, Manila. Inoculation is followed by an incubation period of one month, during which no clinical or serological changes occur. Towards the end of the second month local multiplication of the treponema occurs with implication of the deeper layers of the skin. Between the third and fifth months local exacerbation of the primary lesion is seen and metastatic generalization takes place with an increasingly positive W.R. Clinically three types of infection were seen. In the first a local yaw only; in the second a local yaw followed by secondary generalization, but without tertiaries; in the third a local yaw followed by ulcerative tertiary lesions or late framboesides without secondaries—this being, the author claims, the first time in the history of experimental framboesia that the metastatic and so-called tertiary lesions have been produced. It was further shown that reinoculation up to the fifth month of infected monkeys is followed by the appearance of a local lesion containing treponemas. In the sixth month the result may be positive in a certain proportion of animals, after which the animals are negative to superinfection, such immunity being proved to last for at least two and a-half years. It was also demonstrated that of animals reinoculated in the seventh month those which had received treatment in the first two months of the original disease could be reinfected, while those treated in the later months were immune. These experiments refer to animals which had only developed the primary lesion. As soon as secondary eruptions had manifested themselves animals were immune to superinfection, but immunity was longer delayed in those animals which developed so-called tertiaries. The author argues that it should be possible to immunize animals by inoculating with treponemata the deeper structures of the skin without the production of any skin lesions. In support of this contention a series of monkeys received in five weeks four subcutaneous inoculations of *T. pertenue*, and they were subsequently inoculated [presumably intracutaneously] at intervals. One animal inoculated one week after the last injection developed a yaw, but animals so treated 3 months after the last injection were immune. From this it is deduced that immunity is developed in the subcutaneous tissues, that it resembles that produced by vaccinia for smallpox, and that there is no evidence of "humoral antitreponematous immunity." Comparison is then made with the results obtained by SELLARDS and LACY in human experiments. [Schöbl gives no details of his experiments and with the single exception referred to above makes no reference to the work of others. The paper is not altogether clear and no explanation is offered of some of the results obtained.]

H. S. S.

MAXWELL (J. S.). **Yaws and the Kahn Test. (Preliminary Report).**—*Jl. Trop. Med. & Hyg.* 1927. Nov. 15. Vol. 30. No. 22. pp. 294–296. [American Mission, Nasser, Sobat River, Sudan.]

A preliminary report on serum reactions in 85 cases of yaws by Kahn's method. The author finds that, in the tropics where often the W.R. cannot be undertaken, Kahn's test promises to be of considerable value.

H. S. S.

HANSHELL (H. M.). **Pyrexia in Primary Syphilis.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1928. Jan. 31. Vol. 21. No. 4. pp. 295–298. With 3 charts in text.

Three cases are here reported coming under the author's observation at the V.D. clinic, Royal Albert Dock, which all presented a pyrexia of 99° to 102° F. the temperature immediately falling to normal and remaining so after an injection of an arsenical. All showed a small primary lesion (not immediately discovered in two cases) and some enlargement of inguinal glands; from the chancres *T. pallidum* was recovered in each case; also in each case the blood gave a positive W.R., but was negative for malaria. That a man may seek treatment for pyrexia in whom an initial syphilitic lesion may be present, but has not been noticed, is a point well worthy of remembering in tropical practice.

H. S. S.

WEI YU LIN. **Tabes Dorsalis among the Chinese. A Study of the Symptoms and Serology of Sixty Cases.**—*China Med. Jl.* 1927. Aug. Vol. 41. No. 8. pp. 698–711. [22 refs.]

The subject matter of this paper is an analysis of 60 cases of tabes admitted to the Pekin Union Medical College Hospital in five years, 1921–26, with a view to comparing tabes as seen in the Chinese with the disease as it occurs among Europeans. The general conclusions are that the incidence, sex ratio, age incidence, interval before onset are much the same. The following table deals in short with symptomatology:—

Tabetic Symptoms and Signs in Order of their Frequency.

	Per cent.
1. Absent or diminished knee and ankle jerks ...	95
2. Ataxia or staggering gait	79
3. Romberg's sign	76.66
4. Argyll-Robertson pupils	76.66
5. Sensory disturbances	76.66
6. Muscular hypotonia	73.2
7. Disturbances of bladder	62
8. Lancinating pains	55.66
9. Unequal pupils	51.66
10. Loss of sexual power	48
11. Motor weakness of legs	30
12. Ataxia of upper limbs	23.33
13. Optic atrophy	23.33
14. Girdle sensation	16.66

15. Paresthesia	...	...	...	...	...	13.33
16. Paralysis or paresis of eye-muscles	...	...	...	...	...	11.66
17. Ptosis of eye-lids	...	...	...	...	...	10
18. Arthropathies	...	...	...	...	...	10
19. Mental symptoms	...	...	...	...	...	5
20. Vertigo	...	...	...	...	...	5
21. Visceral crises	...	...	...	...	...	3.33
22. Difficulty in articulation	...	...	...	...	...	3.33
23. Tinnitus in ears	...	...	...	...	...	3.33

Serum W.R. positive in 81.66 per cent., doubtful in 5 per cent. ; negative in 13.33 per cent. Cerebrospinal fluid W.R. in 3 out of 8 negative cases was also negative, in the other 5 positive. In the 5 per cent. doubtful cases (3) cerebrospinal fluid W.R. positive in 1. In 55 of the 60 cases the cerebrospinal fluid W.R. was done—83.6 positive. Among 7 negative cases serum W.R. positive in 3. Cell counts, globulin and gold colloidal reactions are also mentioned.

H. S. S.

PARSONS (R. P.). Le traitement des ulcères tréponémateux par le bismuto-yatren. [**Treatment of Treponematous Ulcers with Bismuto-Yatren.**]—*Bull. Soc. Méd. d'Haïti*. 1927. July. Vol. 1. No. 3. pp. 43-51.

The substance of this paper has already appeared in the *American Journal of Syphilis*, 1927, Vol. 11, No. 3, and been noticed in this *Bulletin*.

H. S. S.

REZENDE (Motta) & FERNANDES (Eurico). Quarta doença venerea. [**Fourth Venereal Disease.**]—*Arch. Brasileiros de Med.* 1928. Jan. Vol. 18. No. 1. pp. 3-21. With 2 charts.

Subacute inguinal lymphogranulomatosis, or the disease of NICOLAS and FAVRE, in its earliest stage appears as a small erosion, so small as to be overlooked in many cases, since it is also painless. This gives place to ulceration, small nodules, papules and vesicles which in turn ulcerate. The condition is present on the glans, the prepuce, or within the urethra and precedes the adenitis by some days. Within the enlarged glands foci of suppuration arise and fistulae may result. The disease is very chronic and intractable.

[Among the synonyms given by the authors to the disease that of granuloma venereum is not mentioned, but from the description given, it appears that this is what they refer to ; if so, much of the work of the last two years on the causation and treatment is omitted.]

H. Harold Scott.

KENYA & EAST AFRICAN MEDICAL JOURNAL. 1928. Jan. Vol. 4. No. 10. pp. 325-327.—Simple Notes on Some Tropical Diseases. A Popular Account of the Commoner Diseases of East Africa, with Hints on General Lines of Treatment, for the Use of Those Out of Reach of Immediate Medical Treatment. V. Yaws.

STEEL (C. R.). The Treatment of Yaws and Syphilis with Bismuth Sodium Potassium Tartrate, compared with that by Neokharsivan.—*Jl. Trop. Med. & Hyg.* 1927. Nov. 1. Vol. 30. No. 21. pp. 274-275.

CLIMATIC BUBO.

KOPPEL (Alice). Lymphogranuloma inguinale mit akuten rheumatischen Erscheinungen. [**Lymphogranuloma Inguinale with Symptoms of Acute Rheumatism.**—*Klin. Woch.* 1927. Dec. 24. Vol. 6. No. 52. pp. 2469-2470. [7 refs.]

The author refers to the now common recognition of this disease in Europe. In Breslau All Saints' Hospital 49 cases were observed in 1925, in contradistinction to *ulcus molle* which has become very rare.

Of the 49 cases, in 43 the local glands only were affected and fever and other general symptoms were temporary phenomena. In three the general symptoms were marked in comparison with the local signs. In three well-marked rheumatic manifestations occurred and these cases are given in some detail on account of the unusual feature.

In one characteristic erythema nodosum appeared on the leg associated with an acute episcleritis; in the second case there were painful swellings affecting joints of wrists, hands and ankles; while the third resembled the first case. This, the author states, adds one more to the resemblances of lymphogranuloma inguinale with *ulcus molle*, similar nodes containing Ducrey's bacillus having been described in the latter disease. In the lymphogranuloma cases Freische's reaction was obtained, but no attempt was made to recover a virus from the nodes.

H. S. Stannus.

WILMOTH (Clifford Lee). **Subacute Inguinal Lymphogranulomatosis. Report of Twenty-Seven Cases.**—*Southern Med. J.* 1928. Feb. Vol. 21. No. 2. pp. 108-113. With 1 text fig. [10 refs.]

The author reports twenty-seven cases under his care in Baltimore. All except one had shortly returned from elsewhere; one from India, two from Southern States, four from S. America and the remainder from the West Indies or Central America. On the etiological and pathological side the paper contains nothing new. Although the author is apparently aware of the protein shock and aspiration treatment advocated by HANSCHALL, in all except one case, excision or incision was practised.

H. S. S.

FISCHER (Otto). Ueber eine Hautreaktion bei klimatischen Bubonen. [**A Skin Reaction in Climatic Bubo.**—*Klin. Woch.* 1928. Feb. 5. Vol. 7. No. 6. pp. 255-256. [6 refs.]

—. Ueber eine Intrakutanreaktion bei klimatischen Bubonen.—*Arch. f. Schiffs- u. Trop.- Hyg.* 1928. Feb. Vol. 32. No. 2. pp. 91-92. [Inst. for Ship & Trop. Diseases, Hamburg.]

FREI first described a specific skin reaction in cases of lymphogranuloma inguinale found in Europe, using an emulsion from affected glands. Fischer now describes his results in 11 cases originating in other continents, cases which would be classified as climatic bubo, using as antigen fluid removed from European cases by gland puncture, diluted 5-8 times with normal saline and heated for 1½ hours to 60° ensuring sterility on culture. The local skin reaction varies from an area of redness with infiltration to the formation of a vesicle resembling a vaccine pustule and lasts up to 4 days, but is best estimated at 48 hours. There is no swelling of lymph glands and no general reaction.

In all 11 cases tested the reaction was positive, whether the disease was recently acquired, of old standing or retrogressing. In 11 controls the results were entirely negative; among these were cases of *ulcus molle*, syphilis and adenitis of other causation. There is thus very positive evidence that lymphogranuloma inguinale of Europe and climatic bubo of tropical countries are one and the same disease.

H. S. S.

HELLERSTROEM (Sven). L'intradermo-réaction dans la lymphogranulomatose inguinale. [**The Intradermal Reaction in Climatic Bubo.**]—*C.R. Soc. Biol.* 1927. Oct. 28. Vol. 97. No. 28. pp. 1168-1170. [1 ref.]

Working in Stockholm the author (who reported on twelve previous cases in *Acta Soc. Med. Suecanoe*, 1927, Vol. 53) gives his results with the intradermal reaction of FREI in fourteen further cases of what he designates inguinal lymphogranulomatosis. He used an emulsion of gland tissue from cases without fistula formation sterilized in a water bath at 60° C. for two hours, prepared by himself, and a similar antigen prepared by FREI and obtained positive results. Injection of the same antigen after being heated to 100° C. and an emulsion of Ducrey's bacillus gave negative results. Eleven cases of other venereal diseases were used as controls and were negative. Two of his cases contracted their disease in Haiti and Cape Verde Islands respectively, and might be called climatic bubo, from which he deduces that inguinal lymphogranulomatosis from which the other cases (presumably with no history of having been abroad) were suffering and climatic bubo are one and the same disease.

H. S. S.

FREI (Wilhelm). Beitrag zur Spezifität der Lymphogranuloma inguinale-Reaktion. I. Teil. Ueber eine Analoge, ebenfalls spezifische Reaktion beim *Ulcus molle-Bubo*. II. Teil. Zur Identität zwischen Lymphogranuloma inguinale und klimatischen Bubonen. [**Specific Skin Reactions in Lymphogranuloma Inguinale and Soft Sore. Identity of the Former with Climatic Bubo.**]—*Klin. Woch.* 1927. Oct. 22. Vol. 6. No. 43. pp. 2042-2044. [7 refs.]

After allusion to his previous work in this connexion the author deals with further experiments carried out. He finds that the skin reactions in lymphogranuloma inguinale and *ulcus molle* are specific in each disease, that these reactions, provided the antigen comes from some other unquestionable source, is a means of making a differential diagnosis, that a case of lymphogranuloma inguinale reacts positively with antigen from a tropical case of climatic bubo, proving that they are one and the same disease, that the skin reaction may be obtained many years after the infection.

H. S. S.

DUFF (D.). **A Case of Purpura following Climatic Bubo.**—*West African Med. Jl.* Lagos. 1928. Jan. Vol. 1. No. 3. p. 42.

The author describes under the above title the case of a European [presumably a male] admitted to Kumasi Hospital for pyrexia (99.6-100° F.) without any other evidence on clinical, blood or stool examination.

Some three or four weeks after the beginning of the fever and ten days after admission, the inguinal glands on the right side became painful and swollen. A diagnosis of climatic bubo was made and treatment, after other methods [not specified] had failed, by a few injections of iodoform in ether was given into the [sic] gland. Temporary improvement occurred, followed a few days later, by fever, joint pains, and the appearance of "four red painful raised areas, three on the legs and one on the right arm, about the size of a half penny or a penny. In appearance they resembled blind boils or erythema nodosum." The pains in the knee and elbow joints were severe, the original red areas turned blue while another crop appeared on the left leg. They were considered to be purpuric in nature and a sequel to the climatic bubo which had apparently cleared up. [The evidence does not appear to be conclusive.]

H. S. S.

DE BELLARD (E. P.). Sobre el tratamiento de la poradenitis inguinal sub-aguda. [**The Treatment of Subacute Inguinal Poradenitis.**]—*Gac. Med. de Caracas*. 1927. Aug. 31. Vol. 34. No. 16. pp. 242-244.

Glandular enlargement, for the purposes of this treatment, is diagnosed as above when the usual causes such as sepsis, venereal disease, and tuberculosis can be excluded. A case recorded is that of a man of 20 years with a glandular swelling the size of a hen's egg. He was given stibenyl intravenously in successive doses of 5, 10, 15, 20, 20, 20 cgm. on alternate days and the swelling, which increased after the first injection, thereafter steadily diminished till the glands were no longer palpable 12 days after the treatment had begun.

H. Harold Scott.

DE BELLARD (E. P.). Sobre el tratamiento de la poradenitis por el stibenyl. [**Stibenyl in the Treatment of Climatic Bubo.**]—*Gac. Med. de Caracas*. 1927. Dec. 31. Vol. 34. No. 24. pp. 371-372. [1 ref.]

The earlier hopes that stibenyl would prove a reliable specific for cases of climatic bubo have not been fulfilled. In the very early stages cure results, but in those of a later stage its use is followed by involvement of other glands both in the neighbourhood, and at a distance. For such, therefore, excision is recommended as the proper form of treatment, followed by a course of stibenyl starting the day after operation.

H. Harold Scott.

DESTEFANO (Francisco) & VACCAREZZA (Raul F.). Traitement de la poradénite inguinale subaigue par les injections d'émétique; résultats obtenus dans 85 cas. [**Treatment of 85 Cases of Inguinal Poradenitis by Tartar Emetic.**]—*Presse Méd.* 1927. Nov. 12. Vol. 35. No. 91. pp. 1378-1379. [2 refs.] [Infect. Diseases Clinic, Faculty of Med., Buenos Aires.]

The authors in 1925 published observations on cases of what in this country we call climatic bubo [see this *Bulletin*, Vol. 23, p. 227].

Since then their total of cases has reached eighty-five. In 18 the right, in 33 the left, in 34 both inguinal groups were affected. In 43 the glands were indurated, in 35 they had softened, in 7 fistulae were present. Antimony potassium tartrate, one per cent. solution in saline intravenously, has been the treatment adopted in all cases with excellent results. Commencing with 5 cc., 8 cc. are given in 3 days and subsequently twice weekly 10 cc. until cure has been obtained. Eight injections sufficed in 46 cases, 19 received 15 injections and 8 required 16-32 injections.

H. S. S.

GRANULOMA VENEREUM.

DE VOGEL (W.). La lutte contre le "granuloma venereum" chez les Marindinois, dans la Nouvelle Guinée Hollandaise. [**Granuloma Venereum among the Marindinas of Dutch New Guinea.**]*—Bull. Office Internat. d' Hyg. Publique.* 1927. Aug. Vol. 19. No. 8. pp. 1137-1145. With 1 fig.

In 1918 attention was called to the rapidly diminishing numbers of the Marindinois, a semito-hamitic tribe inhabiting the southern province of Dutch New Guinea. The cause was discovered by Dr. SITANALA in 1915 to be the very widespread infection with granuloma venereum.

A campaign against the disease, which is spoken of as an epidemic, was organized and carried on between the years 1922-1926 by Dr. THIERFELDER and his wife. They found from 12-35 per cent. of the population in various areas affected. The spread of the disease is ascribed to the promiscuous intercourse which their custom permits and to prostitution, but it is noted that though immigrant Malays have sexual access to women of this tribe suffering from the disease they appear seldom to contract infection, as if there were some racial immunity or long exposure were necessary; among 5,000 cases studied only four Malays were seen. Incubation is put down at two weeks. Among the same total of cases in 38 there was said to be "generalization" by the blood stream, lesions occurring anywhere on the body, but with a predilection for the angle of the jaw. In a single case an abscess of the liver occurred the pus containing the "*Kalymno bacterium granulomatis*." 5,736 cases were treated with tartar emetic along the usual lines, 86.1 per cent. were cured after one series, and 12.8 per cent. required further series of injections.

H. S. Stannus.

THIERFELDER (M. U.). Extragenitale Infektion mit venerischem Granulom. [**Extragenital Infection with Granuloma Venereum.**]*—Abhandl. a.d. Gebiet d. Auslandskunde. Hamburg. Univ.* 1927. Vol. 26. (D., Med. & Vet. Vol. 2.) [Festschrift NOCHT.] pp. 553-555. With 2 coloured figs. on 1 plate. [3 refs.]

The author makes a distinction between cases in which extragenital lesions are secondary to genital lesions and cases in which the initial lesion is extragenital. In the literature he could only find a single

case (MAITLAND 1899) of this kind. There the mouth was affected and a venereal origin could not be excluded. The case of STOWERS and TEMPLETON was a doubtful case of the condition under consideration; that recorded by SEQUEIRA and PEDROSO was obviously one in which the lesions had become generalized from a primary genital site and the same is true of the nine cases published by Fox.

Among 6,000 cases of G.V. treated in Dutch South New Guinea in 1923-26, two cases of true extra-genital disease were met with:—

Case 1. A boy aged 10 years whose foster father was suffering from a penile lesion (G.V.) with a good deal of cicatrization about the meatus causing a stricture, which he was in the habit of dilating with a nail each time he wanted to pass urine. This nail he kept for the purpose, but also used it to dilate a perforation in his son's ear for the insertion of an ear-ring with the result that the boy developed a G.V. which grew to the size of a walnut and spread to the adjoining cheek. Treatment with considerable interruptions during one and a-half years by intravenous tartar emetic resulted in considerable improvement only.

Case 2. A woman aged 30 whose husband, by reason of a G.V. affecting the genitalia was unable to have normal sexual intercourse with her. She had been in the habit of giving manual relief to her husband's sexual impulses and developed a sore on her right index finger.

H. S. S.

GIBSON (E.). **Another Case of Ulcerating Granuloma.**—*West African Med. Jl.* Lagos. 1927. Oct. Vol. 1. No. 2. p. 15.

A note on a second case of ulcerating granuloma (granuloma inguinale) which responded after two weeks and had healed after two months' treatment with stovarsol and bismoxyl. The patient, a Kanuri boy of 19 years, showed widespread lesions of penis, scrotum and both inguinal regions. No further history of the case is mentioned.

H. S. S.

CAMPBELL (Meredith F.). **Etiology of Granuloma Inguinale. With Report of Eighteen Cases.**—*Amer. Jl. Med. Sci.* 1927. Nov. Vol. 174. No. 5. pp. 670-679. With 6 text figs. [14 refs.] [Bellevue Hosp., New York.]

Reports eighteen cases and experimental work done in connexion with them, summarized in the author's own words:—

"Granuloma inguinale is a clinical entity rapidly acquiring more general recognition and a literature of its own.

"It is found chiefly among negroes, particularly those from the Southern States.

"While affecting the genital and perigenital tissues chiefly, it is not a venereal disease; transmission by sexual intercourse has not been observed.

"The etiology is indefinite, for while the intracellular inclusions described by Donovan seem to bear a direct relationship to the disease and are found with striking constancy, the disease has never been experimentally produced by the injection of these organisms (or what is considered morphologically and culturally to be these organisms) alone.

"Experimentally, we have obtained uniformly negative results in the reproduction of the disease by bacterial injection. To date, Koch's postulates have not been specifically fulfilled.

"Tartar emetic intravenously constitutes a specific treatment."

H. S. S.

CAMPBELL (Meredith F.). **Etiology of Granuloma Inguinale, with Report of Eighteen Cases.**—*Venereal Dis. Information*. 1928. Mar. 20. Vol. 9. No. 3. pp. 93–99. [14 refs.] [Bellevue Hosp., New York.]

The author gives an account of the disease as met with in 18 persons [see previous summary], all coloured save one. Donovan bodies were discovered in 11 of 17 cases in which they were looked for. For their isolation Sabouraud's medium (4 per cent. maltose peptone agar) is essential. Once isolated they grow well on the more common media with cultural characteristics in harmony with those of other observers. Attempts to infect guineapigs, rabbits, a monkey and two men failed.

H. S. S.

GOUGEROT, BERTILLON & ROQUES (Alice). **Granulome vénérien français ou phagédénisme de Mac Léod-Donovan.** [**Granuloma Venereum or McLeod-Donovan Phagedaena in France.**]*—Rev. Prat. Malad. des Pays Chauds*. 1927. Dec. Year 6. Vol. 7. No. 12. pp. 603–616. With 2 text figs. [2 refs.]

The report on a case of what the authors describe as a phagedenic ulceration of vulva and axilla in a woman who had entered hospital for polyuria and adiposity of pituitary type. The lesion began in the cruro-vulval fold and spread to the vulva, perianal region and rectum and to the axillae as a diffuse red pruriginous area which became ulcerated as the result of scratching with no glandular enlargement. The authors believe their case to be one of granuloma venereum in spite of certain clinical differences and the absence of Donovan bodies. The only organism isolated was Friedlander's pneumobacillus. W.R. negative. Treatment by local cauterization with silver nitrate and N.A.B. and mercuric cyanide internally were without result, but radiotherapy caused complete cicatrization in a short time.

H. S. S.

WEHRHEIM (Heinrich L.). [**Oral Infection in a Case of Granuloma Inguinale.**]*—Urol. & Cutaneous Rev.* 1927. Vol. 31. p. 760. [Summarized in *Venereal Dis. Information*. 1928. Mar. 20. Vol. 9. No. 3. pp. 124–125.]

A report on the case of a negro admitted to hospital suffering from ulceration of the right groin for six years and for six months ulceration involving the mucus membrane of the left cheek, superior alveolus, hard and soft palate from which Donovan's bodies were recovered and which healed under treatment with tartar emetic.

H. S. S.

BUREAU OF HYGIENE AND TROPICAL DISEASES.

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[No. 9

PLAGUE

NIKANOROFF. La peste au Sud-Est de l'Union des Républiques Soviétistes Socialistes. [**Plague in the S.E. Soviet Republics.**]—*Bull. Office Internat. d' Hyg. Publique.* 1928. Apr. Vol. 20. No. 4. pp. 537-564. With 4 text figs. & 1 map.

This is an ordinary report describing outbreaks of plague from 1898 to 1927. The localities and number of cases are given in a table. The usual source of infection is the spermophiles: *Sp. musicus* and *Sp. mugosaricus* in the south-east and mice in the south. *Cynomys fulvus*, gerbilles, etc., are also found over the large area referred to, and these are known to suffer from plague. The fleas mentioned are *Cerato-phyllus tesquorum*, *Neopsylla setosa* and *Ctenophthalmus breviatus* n. sp. Much of the material in this report has appeared in previous papers [see this *Bulletin*, Vol. 24, pp. 935-937 (NIKANOROFF to GOLOV); p. 455 (ZABOLOTNY)].

J. H. Tull Walsh.

KLING (C. A.). L'apparition de la peste en Suède en 1927. [**Arrival of Plague in Sweden, 1927.**]—*Bull. Office Internat. d' Hyg. Publique.* 1928. Apr. Vol. 20. No. 4. pp. 565-567.

The merchant ship *Ransholm* from Rufisque in Senegal had a case of plague shortly after leaving port. Just before the ship arrived at Rotterdam another sailor complained of inguinal pain and a third showed the same symptoms as the other two. When the ship arrived at Gefle on the Baltic the Sanitary Inspector was warned, and the cases were examined. Yersin's bacillus was found in pus from the first case. Of 21 men 4 were attacked but the infection was not very virulent. The ship was fumigated and rats destroyed.

J. H. T. W.

SUÁREZ (Pablo Arturo). Algunas observaciones sobre la peste negra y la pulga *Cheopis* en el Ecuador. [**Plague and *Xenopsylla cheopis* in Ecuador.**]—*Bol. Oficina Sanitaria Panamericana.* 1928. Apr. Vol. 7. No. 4. pp. 453-471. With 8 charts and 1 map in text.

Plague first appeared in Guayaquil in February, 1908. It spread amongst the human population for three months only, but remained among the rats, 1-2 per cent. being found infected throughout the year. Subsequently, till 1916, human cases were seen occasionally,

about 3.96 per mille during the period October–May, and since 1917 only 1.34 per mille. Almost the only flea found among rodents where plague existed was the *X. cheopis*. Usually the number found was 1.3 per rat, but where the index rose to 6 or over plague has been permanently endemic. In Guayaquil the index in winter was 6, in the summer 1.6. In Ambato plague is occasionally present and the index varies with temperature and atmospheric conditions; in the years in which there was no plague either in rodents or man the index was 0.71. The flea was not found in rodents in districts where the mean temperature was below 14° C.

In the eight months during which the flea investigations were carried out 2,070 rats were examined from the hilly districts, and 3,430 from Guayaquil and its environments, while 18,872 fleas were classified from the former and 9,822 from the latter. The species of rat most numerous on the coast was *R. alexandrinus*, in the hills *R. norvegicus* and *Mus musculus*.

H. Harold Scott.

CHACÍN ITRIAGO (L. G.). La peste bubónica en Venezuela. [**Bubonic Plague in Venezuela.**]—*Gac. Med. de Caracas*. 1927. Oct. 31. Vol. 34. No. 20. pp. 309–314. With 2 maps.

Plague is said to have first appeared in Venezuela in 1908 from Trinidad. The district invaded was La Guaira and the epidemic disappeared at the end of the year. In Caracas, however, it recurred, with the exceptions of 1913, 1915, and 1917, every year till 1919. Investigations showed that all the patients were employed at, or were constant visitors to, the Public Market of Valles de Tuy. Isolation of the sick, closure of the market, examination of the rats caught and measures to exterminate them in the market and the homes round about have resulted in the abolition of plague since 1919. Though several thousand rats are still examined yearly none have been found infected.

H. Harold Scott.

CONNAL (Andrew) & PAISLEY (J. C.). **Intestinal Haemorrhage in Rats suffering from Septicaemic Plague considered as a Factor in the Spread of Human Pneumonic Plague.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1928. Jan. 31. Vol. 21. No. 4. pp. 289–294. With 1 map. [Medical Research Inst., Lagos.]

In the course of the routine examination of captured rats in Lagos it was noted that in a number of animals, dead of septicaemic plague, the intestines were more or less full of blood. The macroscopic appearances are striking. The entire or greater length of the intestines is distended and thin-walled, and the bright red contents are very obvious. The stomach has never been found involved. The contained matter consists of blood-stained fluid with mucus, faecal matter and a number of worms. Stained smears show the plague bacillus. There is no ulceration of the intestines nor any sign of traumatic cause of the haemorrhage. The possibility of an alimentary infection was considered. The absence of retro-peritoneal or other buboes in the abdominal cavity did not favour this supposition. Attempts to infect healthy rats by feeding with the liver and spleen of infected rats failed. It was concluded that this haemorrhage in

rats that died of septicaemic plague is a late manifestation of that disease. Experiments were performed to see whether this blood-stained material would produce pneumonic plague. In five instances the infective material was introduced intratracheally mixed with sterile dust, resulting in the death of four monkeys from pneumonia. In three cases the material was applied as dry spray over the mouth and nostrils, failing to cause infection. In two cases the infective matter was applied as a liquid spray with positive result in one case.

J. H. T. W.

WU LIEN-TEH. Problèmes concernant la peste pneumonique. [**Pneumonic Plague.**]—*Bull. Office Internat. d'Hyg. Publique.* 1928. Apr. Vol. 20. No. 4. pp. 573–589. [2 refs.]

Although this paper contains nothing new it is of considerable interest. The author reviews the history of pneumonic plague from the fourteenth century to the present time. He gives a short account of the sources of infection and pathology and finally discusses the value of vaccines and serums.

J. H. T. W.

SCHUT (J.). Over het optreden en de behandeling van longpest en septicaemische pest in den Tengger (Java). [**Outbreaks and Treatment of Pulmonary and Septicaemic Plague in the Tengger District (Java).**]—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1928. Vol. 68. No. 1. pp. 99–111.

Schut describes three small outbreaks of septicaemic and pulmonary plague in villages of the mountainous Tengger district (East Java). The epidemiology of the outbreaks presented no features of special interest; the clinical picture was the usual. The author is inclined to believe that cases among the contacts whose temperature rose above 37° C., or whose pulse rose above 130 (especially without adequate rise of temperature) were mild cases of plague. In a few of such cases and single cases of clinically more marked plague he thinks that the favourable outcome may be ascribed to treatment with quinine-urethane injections (twice per day 1–2 gm) or aristochin (3 times 0.5 gm.). He also advises a trial with prophylactic administration to the contacts of omnadin, the antibacterial action of which in various infectious conditions appears promising, but which, by lack of antitoxic properties, fails in cases of manifest plague.

W. J. Bais.

DAWSON (A. S.). **The Treatment of Bubonic Plague by Intravenous Injections of Anti-Plague Serum.**—*Indian Med. Gaz.* 1927. Dec. Vol. 62. No. 12. pp. 691–692.

As soon as one knows the case to be one of plague there should be no hesitation in giving an intravenous injection of 30 to 40 cc. of anti-plague serum, and a further dose of 20 to 60 cc. of the same serum into the cellular tissue of the abdomen or into the inner aspect of the thighs or flanks. The dosage of the serum may depend on the temperature but no hesitation should occur in spite of even very high temperature. Immediately following on the injections, within six

hours, the temperature will fall to 99° F., or normal, and the results are so encouraging that even if you see the patient in an unconscious condition you may hope to save his life. The author has dealt with more than 200 cases of plague during the years 1924-25-26-27. Of 50 cases first seen in a moribund condition there is a record of 16 successfully treated by this method. When the temperature is very rapidly dropping to normal or sub-normal with profuse sweating the patient's relatives should be warned that fatal cardiac collapse may supervene if the patient sits up or tries to move. Absolute and complete rest in bed is indicated and a stimulant heart tonic is given. The author uses the following prescription:—

Liq. Adrenalin hydrochlor (P. D. & Co.)	...	...	m 40
Tt. Digitalis (P. D. & Co.)	...	...	m 30
Sp. Ammon. aromat.	...	...	m 30
Aq. ... ..	...	...	...ad oz. 1

every second or third hour if necessary.

The serum used was obtained from the Pasteur Institute of Paris; the fresher the serum the better the result.

J. H. T. W.

DE SMIDT (F. P. G.). *Bacillus pestis*: **Agglutination and Absorption Tests.**—*Kenya & East African Med. Jl.* 1928. Feb. Vol. 4. No. 11. pp. 337-347. [5 refs.]

The experiments were carried through with a view to determining whether specific variants exist in the plague group such as exist in the typhoid group of bacilli. Subcutaneous injections of killed *Past. pestis* (bacillus pestis) did not furnish agglutination sera, but a serum of titre 1-17500 was obtained by injection, in the rabbit, of a live culture of an avirulent laboratory strain in amount 0.3 mgm. and thereafter 0.55, 0.55, 1.1, 2 mgm. at intervals of 38, 16, 8 and 20 days. The broth used in culture of the plague bacillus is obtained by auto-digestion of pancreas and has a reaction pH 7. All cultures for titration were in a 10 per cent. dilution of this broth, which was incubated at 30° C. for 48 hours, diluted to standard opacity and formalinized at 0.2 per cent. Very little difficulty was experienced with spontaneous agglutination in the tests. The absorption method of testing was so designed as to be economical of the agglutinating serum. A full account of experiments and method is to appear elsewhere.

W. F. Harvey.

BEZSONOVA (A.), SEMIKOZ (T.) & KOTELNIKOV (G.). **Atypic Forms of the Colonies of *B. pestis*.**—*Rev. Microbiol. et Epidémiol.* 1927. Vol. 6. No. 4. English summary pp. 472-473. [In Russian pp. 394-401. With 15 text figs. 21 refs.]

The literature is referred to in detail (p. 401). The colonies described and figured were seen during experimental work on guineapigs. Out of 755 tests these atypical colonies occurred in about 5 per cent., mostly in agar cultures from urine, bile and lymphatic glands. They have, under a low power objective, yellowish-brown colour with uniform

layers in the centre surrounded by a more or less wide zone of large grained construction. In general appearance such colonies resemble somewhat a sunflower. Sown in broth or agar as subcultures these varieties produce typical growths. The guineapig infected from these atypic colonies perished giving pure typical culture of *Past. pestis*.

J. H. T. W.

SMIRNOVA (E. I.). **On the Fitness of Salt Media for the Differential Diagnostics of Plague and Pseudotuberculosis in Rodents.**—*Rev. Microbiol. et Epidémiol.* 1928. Vol. 7. No. 2. English summary p. 229. [In Russian pp. 176–182. 3 refs.] [State Inst. of Microbiol. & Epidemiol. for S.-E. of U.S.S.R.]

Past. pestis (bacillus pestis) and *B. pseudotuberculosis rodentium* gave growth only when the content of salt in broth did not exceed 4 per cent.

W. F. Harvey.

LAUD (D. S.). **Haffkine's Anti-Plague Vaccine as a Prophylactic against Plague, amongst Primates.**—*Vet. Jl.* 1928. Mar. Vol. 84. No. 3. pp. 117–122.

The author records three cases of plague among dog-faced baboons in the Bombay zoological gardens. It is stated in one case: "Plague bacilli seen in the smears of spleen, liver and heart blood." These cases occurred in May, 1925. During June a number of monkeys were inoculated with Haffkine's anti-plague vaccine. Three tables give the name of the species of monkey and the dose injected. No more cases of plague were seen. The source of infection is not clearly stated.

J. H. T. W.

DE SMIDT (F. P. G.). **Nairobi Plague Prophylactic: Notes on its Potency.**—*Kenya & East African Med. Jl.* 1928. Mar. Vol. 4. No. 12. pp. 364–378. [7 refs.]

The Nairobi vaccine is prepared on the lines of the Haffkine vaccine of Bombay. Animal experimentation with this vaccine was carried out on white rats. In one such experiment, in which 12 rats were treated prophylactically with 0.3 cc. vaccine and 12 remained as untreated controls, there were 8 survivors among the treated with a test dose of 0.2 mgm. plague bacilli and none among the controls. Suggestive returns have been obtained of the value of the Nairobi vaccine in practice, although vaccination data are difficult to collect, probably more so than in India. The reaction to plague inoculation is disagreeable and this constitutes a difficulty in persuading the inhabitants of Kenya to be inoculated on a large scale except in the presence of an epidemic. It has not, accordingly, been considered expedient to exceed the standard dose of 2 cc. and it is considered that inoculation should be repeated where necessary every six months.

W. F. Harvey.

GIRARD (G.). Septicémie à bacille de Yersin chez des lapins domestiques. Sa relation avec la peste murine. [**Septicaemic Plague in Tame Rabbits and its Relation to Rat Plague.**]—*Bull. Soc. Path. Exot.* 1928. Apr. 18. Vol. 21. No. 4. pp. 299–301. [3 refs.] [Pasteur Inst., Tananarive.]

An epidemic among breeding rabbits was preceded by the finding, in the neighbourhood, of a rat dead of plague and the occurrence of a human case. In this epidemic 35 rabbits out of 50 had died with symptoms of haemorrhagic septicaemia and numerous cocco-bacilli with bipolar staining were found in films from spleen and liver. Guinea-pigs inoculated on the shaven skin with spleen pulp of dead rabbits died in 3 or 4 days with all the signs of septicaemic plague. The organism isolated from the heart had all the characters of the plague bacillus, grew better at 22° C. than at 37° C., grew in chains in bouillon, which it did not render turbid, did not ferment lactose, saccharose or glycerin, but fermented mannite and glucose without production of gas. White rats and mice succumbed to inoculation with the organism. The failure to ferment saccharose is said to be a character differentiating the plague bacillus from pasteurella organisms and failure to ferment glycerin from pseudotuberculosis of rodents. Moreover the organisms isolated from rabbits were pathogenic for the white rat in contrast to the organism of pseudo-tuberculosis. The rabbit flea is *Spilopsyllus cuniculi*. Neither cheopis nor ceratophyllus were found on the rabbits. It is considered that a case has been made out for the possibility of transmission of plague from rat to rabbit.

W. F. Harvey.

IIMURA Les épidémies de peste au Japon.—*Bull. Office Internat. d'Hyg. Publique.* 1928. Apr. Vol. 20. No. 4. pp 568–572.

KENYA & EAST AFRICAN MEDICAL JOURNAL. 1928. Feb. Vol. 4. No. 11. pp. 347–350.—Simple Notes on Some Tropical Diseases. A Popular Account of the Commoner Diseases of East Africa, with Hints on General Lines of Treatment, for the Use of Those out of Reach of Immediate Medical Treatment. VI. Plague.

J. H. T. W.

CHOLERA.

YUE (M. K.). **The Epidemic of Cholera in Hinghwa City, Fukien, 1st to 25th September, 1927.**—*China Med. Jl.* 1928. Mar. Vol. 42. No. 3. pp. 151-153.

One cholera epidemic is much like another, but this short paper is interesting and well written. The author describes the city of Hinghwa, with its gates and fine circular wall four miles long. It contains 40,000 inhabitants. All wells are supplied by surface and subsoil water and grossly polluted. The large number of leaking latrines and their close proximity to the wells is staggering. When the epidemic was at its height the streets were deserted and fear was written on the faces of those seen walking about. A spacious monastery close to the hospital was converted into a temporary cholera hospital. Twenty-five cases were admitted and eighty treated outside. Rogers' saline treatment and "Tomb's Mixture" were used and sanitary measures were adopted. "At the beginning of our work, we were prepared to meet with opposition, but to our great surprise we were received with open arms. . . . Fear has driven the people to give Western medical methods a trial." As an aftermath a group of gentlemen went round with their hats making a household collection. Three thousand dollars was collected and a ceremony was held at the temple known as "praying for peace." Each householder was given two red lanterns to hang in front of the door. The streets were swept; never was the city so clean.

J. H. Tull Walsh.

DAWSON (A. S.). **A Note on the Treatment of Cholera.**—*Indian Med. Gaz.* 1928. Apr. Vol. 63. No. 4. p. 204.

The author describes his routine method in the treatment of cholera with an "essential oils" mixture and saline injections. The paper contains nothing new.

J. H. T. W.

PALMER (F. J.). **The Treatment of Cholera by Acid and Cresol.**—*Indian Med. Gaz.* 1928. May. Vol. 63. No. 5. pp. 259-260.

This is a further contribution to treatment of cholera by acid and cresol. [see this *Bulletin*, Vol. 22, p. 766 (PALMER)].

J. H. T. W.

ROSS (W. C.) assisted by BAGCHI (K. N.) & ROY (B. C.). **The Bacteriophage in Cholera.**—*Indian Jl. Med. Res.* 1928. Apr. Vol. 15. No. 4. pp. 965-968. [3 refs.]

It was found possible to isolate an active bacteriophage from the stools of cholera cases taken at various times, from 6 hours to 4 days after onset of rapid and strong natural recovery. The most active choleraphage was obtained on the 3rd day. It is specially noteworthy that six control cases, in which no definite natural recovery took place, furnished no active bacteriophage. The bacteriophages were of various degrees of virulence and, for the most part, that virulence was increased by repeated subculture for 1 to 3 weeks in Martin's bouillon. Of 16 cases treated with choleraphage only two died, as against 3 deaths out of 7 treated otherwise; but the author does not regard these figures as having statistical validity. The

treatment consisted of an injection of 0.25 cc. of cholera phage and 2 cc. by the mouth, as soon as a case was admitted. A study of records indicated that a strong natural recovery began to manifest itself within 12 hours of administration and continued uninterruptedly.

W. F. Harvey.

KRAUS (R.). Zur Frage des Formenwechsels der Vibrionen. [**Variability of Form in Vibrios.**]—*Cent. f. Bakt.* I. Abt. Orig. 1928. Vol. 106. pp. 163-169. With 9 text figs. [State Serotherapy Inst., Vienna.]

A case of watery diarrhoea with high temperature, occurring during the puerperium, afforded a pure culture of a non-haemolytic vibrio, which was neither a cholera vibrio, a paracholera vibrio, nor one of the fish vibrios of DAVID (this *Bulletin*, Vol. 24, p. 927). On agar the vibrio showed characteristic morphology at 37° C., but became shorter and thicker when incubated 48 hrs. at 22° C. When bouillon cultures of 24 hrs. or older were examined, typical vibrios were found in the surface pellicle. The organisms from the depth of the culture, however, were for the most part spherical and stained either intensively, or feebly, or metachromatically; some were even gram-positive. Subculture on agar restored the typical vibrio form. The interesting fact was demonstrated that the true cholera vibrio, the El Tor and Nasik vibrios, and the vibrios of Metschnikoff, Finkler-Prior, and David showed exactly the same variations in the same circumstances. Whether these represent involution forms or developmental forms in the sense of LOEHNIS, ALMQUIST and ENDERLEIN, the author is not prepared to say. The vibriolytic spherulation brought about in a Pfeiffer's intraperitoneal test with immune serum differs from the spherical culture forms in the absence of variations in size and staining reaction.

W. F. Harvey.

LAGRANGE (E.). Sur quelques particularités des vibrions cholériques. [**Peculiarities of Cholera Vibrios.**]—*C. R. Soc. Biol.* 1928. May 25. Vol. 98. No. 17. pp. 1526-1527. [4 refs.] [Bact. Lab., Maritime-Quarantine Health Council of Egypt, Alexandria.]

Different strains of cholera vibrios which were examined showed very variable powers of coagulating and of liquefying proteins. They showed also very variable titres of agglutination by the same serum and other variable characters.

W. F. Harvey.

ANDREI (Giuseppe). Sulla agglutinabilità del V. del colera e dei V. colerasimili da parte dell'acido lattico. [**Agglutinability of the Cholera Vibrio and of Cholera-like Vibrios.**]—*Bol. d'Istituto Sieroterap. Milanese.* 1927. Feb. Year 5. Vol. 6. pp. 47-53. [9 refs.] French summary p. 53. [Inst. of Bact. & Immunol., R. Univ., Turin.]

Fifteen strains of cholera vibrio and 4 cholera-like vibrios were investigated by the method of lactic acid agglutination of VERCELLANA, by the peptone agglutination method of LUSENA and by the thermo-agglutination method of BURNET. None of these served to differentiate the one group from the other.

W. F. Harvey.

HACHIYA (Tsunetaro) & TAKAHASHI (Masamichi). [**Studies on the Strains of Cholera Vibrios in 1927 Epidemic.**]—*Tokyo Iji-Shinshi (Tokyo Med. News)*. 1927. Oct. No. 2543. [Summarized in *Japan Med. World*. 1928. Feb. 15. Vol. 8. No. 2. p. 41.]

The authors carried out biological and immunological tests with five strains obtained from cases occurring during the 1927 epidemic of cholera ; one from a case occurring in Shanghai and four from cases among ship passengers arriving at Yokohama. The results were the same in all five as regards biological and bacteriological tests ; but from the view point of agglutination three were identical with Kabeshima's so-called typical strain while the other two were like his atypical strains. It was interesting to notice that both types, having differences in agglutination, co-existed in the same epidemic.

J. H. T. W.

FUJIMORI (K.). Ueber die Impedinerscheinung der Komplement-bindungsreaktion bei Choleravibrionen. [**On the Impedin Phenomenon of the Complement Fixation Reaction with Cholera Vibrios.**]—*Ztschr. f. Immunitätsf. u. Experim. Therap.* 1928. May 7. Vol. 56. No. 1-2. pp. 175-190. [9 refs.] [*Surg. Clinic, Imperial Univ., Kyoto.*]

The imedin phenomenon is represented, in the test, by the inhibitory action on the amount of fixation by antigen exerted by an unheated culture filtrate. That inhibition is removed by heating, while the fixing power of the antigen is practically unaffected. The criteria, distinguishing specific complement fixation reactions from non-specific, which are adopted and confirmed, are :—(1) Extraction of lipoids of the antiserum is wholly without effect in a specific reaction but causes the reaction to disappear if non-specific ; (2) conformity with the law of multiple proportions by which simultaneous and equal increase of antigen and antiserum gives directly proportional results ; and (3) with the law of homologous complement fixation by which fixation occurs sooner with increase of antigen quantities than with serum quantities. Two modes of determination of amount of fixation were employed, one, the better, in which the quantity of erythrocytes left unhaemolysed at the end of the reaction was measured and the other in which the maximum amount of complement fixed was taken as the measure. It was found that, (1) anticomplementary action or "spontaneous complementosis" is definitely greater with heated vibrio filtrate than with unheated ; (2) specific complement fixing action was also greater for a heated filtrate than for an unheated ; (3) the quantities of unhaemolysed erythrocytes in a test involving the use of unheated culture filtrate as antigen, of filtrate heated for 20 mins. at 100° C. and of filtrate heated for 120 mins. were in the proportions respectively 8, 16.5, and 12 ; (4) a factor, which has to be calculated, must be employed to obtain from residue of unhaemolysed erythrocytes the relative complement fixing power of different antigens ; (5) the imedin phenomenon, both for specific and non-specific complement fixation was demonstrated with cholera filtrates.

W. F. Harvey.

FRIEDENREICH (V.). Vibrions provoquant le phénomène d'agglutination sanguine de Thomsen. [**Vibrios causing Blood Agglutination.**]—*C. R. Soc. Biol.* 1928. Mar. 23. Vol. 98. No. 11. pp. 894-896. [3 refs.] [*Inst. of General Path., Univ., Copenhagen.*]

The author has already shown (*C. R. Soc. Biol.* xcvi, 1927, 1079) that the agglutination of erythrocytes of all blood groups by serum

of any group, which THOMSEN (*C. R. Soc. Biol.*, xcvi, 1927, 556) observed occasionally when tests were delayed for 18 to 24 hours, was due to the action of a coryneiform bacterium called by him "M". The serum agglutinin was distinct from the *a* and *b* blood group agglutinins. He has now found another bacterium "J" and strains of cholera and cholera-like vibrios, which effect the same transformation of erythrocytes. An example of this phenomenon is given for the cholera vibrio. A 2 per cent. suspension of erythrocytes of type II is centrifuged and the supernatant fluid replaced by the filtrate of a 4-day bouillon culture (at 22° C.) of *Vibrio cholerae*. Agglutination of this suspension was tested with the serum of the same individual and gave a titre of 1 in 4 in 30 minutes, 1 in 16 in 45 minutes and an end titre of 1 in 24 in 90 minutes. Erythrocytes, transformed by one organism, absorbed the special agglutinin from the serum for all other organisms.

W. F. Harvey.

FAIRBROTHER (R. W.). **The Structure of the *V. cholerae*, with Reference to its Immunizing Properties.**—*Brit. Jl. Experim. Path.* 1928. Apr. Vol. 9. No. 2. pp. 89-96. [26 refs.] [Pasteur Inst., Paris, & Lister Inst., London.]

HORDER and FERRY (*Brit. Med. Jl.* 1926. Vol. 2. p. 177) showed that the washings of organisms afforded a fluid with high agglutino-genic value, which was practically non-toxic. In the author's experiments the supernatant fluid, obtained by centrifuging for 2 hours at 6-7,000 revolutions a 24-hour bouillon culture of *V. cholerae*, was re-centrifuged for one hour. This second supernatant fluid, called the "centrifugate" had 0.5 per cent. phenol added to it and was tested for protective power against other vaccines. It was not a pure washing, for it still contained about half a million vibrios per cc., as well as all the substances which are easily detachable from organisms. The other vaccines used were prepared by heating the whole bouillon culture to 100° C. or 56° C. for varying times, adding 0.5 per cent. phenol and using these, or "centrifugate," or the deposit of organisms after the supernatant fluid had been removed. Two experiments may be selected in illustration of the results obtained.

(1) Guinea-pigs were inoculated with 0.5, 1, and 2 cc. of vaccine subcutaneously on alternate days. Nine days after the last dose 1-10th of a 24-hr. agar slope of living vibrios was administered intra-peritoneally in the test vaccine animals and 1-15th of a slope in the control untreated animals. With (a) whole vaccine heated 1 hr. at 56° C., (b) "centrifugate," (c) bacterial deposit and (d) controls, for 8, 7, 5, and 4 animals used respectively, the survival rates were 75, 43, 80, 0 per cent.

(2) With (a) whole vaccine heated 1 hr. at 56° C., (b) whole vaccine heated 1 hr. at 100° C., and untreated controls, for 8, 8, 4 animals used, the survival rates were, 25, 62.5, and 0 per cent. respectively.

Summarized, the experiments, as a whole, lead to the conclusions:—
1. A small degree of protection is afforded by the use of "centrifugate" but this is probably due to the presence of vibrios. 2. The substance of *V. cholerae* which on inoculation gives rise to protection in animals, is intimately connected with the body protoplasm; it is also heat stable (100° C. 1 hour).

W. F. Harvey.

INOUE (Z.). De la réceptivité de la muqueuse intestinale au cours de l'immunisation contre le vibron cholérique. [**Extracts of Intestinal Mucous Membrane and Cholera Immunization.**—*Ann. Inst. Pasteur.* 1928. Apr. Vol. 42. No. 4. pp. 394-402.]

The organs used were washed, minced, suspended in normal salt solution, left 24 hrs. in the ice chest, heated for 30 minutes at 56° C. and centrifuged. This organ extract was injected intraperitoneally in the guineapig and immediately after a lethal or sublethal dose of cholera was injected. The cholera culture used killed intraperitoneally in a dose of 1-20 of an agar slope.

1. *Control series.* (a) Three guineapigs received 2, 1, and 0.5 cc. of normal intestinal extract, followed by 1-50 cholera culture; (b) 3 guineapigs received the same amounts of intestinal extract of a parenterally vaccinated guineapig, followed by 1-50 and 1-30 cholera culture; (c) 3 guineapigs received the same amounts of intestinal extract without vibrios; (d) 2 guineapigs received 1-50 and 1-30 cholera culture without intestinal extract. Guineapigs of experiment (a) all died, of experiment (b) all survived, and of experiment (c) showed no symptoms. The guineapig of experiment (d) which received 1-30 cholera culture died, that which received 1-50 lived. Sensitization of the guineapig by intestinal extract of unvaccinated animals to a non-lethal dose is manifest in this control experimentation. That it is a non-specific sensitization was shown by the fact that the same phenomenon was evident with extracts of liver, kidney and muscle.

2. The results for the test series were:—(1) Guineapigs receiving intestinal extract of parenterally vaccinated animals survive inoculation of the lethal dose (1-20) of culture. (2) Guineapigs receiving intestinal extract of animals vaccinated *per os* react just as if they had received intestinal extract of unvaccinated animals. (3) Guineapigs receiving liver and kidney extracts of parenterally vaccinated animals are not sensitized by these to sublethal doses of cholera (1-50). (4) Guineapigs receiving normal intestinal extract, which has been treated with bile for 15 hrs., washed and then treated for 15 hrs. with anticholera serum and again washed, survive inoculation of the lethal dose of cholera, whereas those receiving extract treated by specific serum only without bile succumb, as also do those receiving extract treated by bile and normal serum. (5) Guineapigs ingesting bile and then killed cholera vaccine are immunized to an intraperitoneal lethal dose whereas those ingesting cholera vaccine without bile succumb.

W. F. Harvey.

KRAUS (R.) & KOVÁCS (N.). Ueber die experimentellen Grundlagen eines neuen Schutzimpfungsverfahrens gegen Cholera mittels Toxoide. [**Experimental Basis of Protective Inoculation against Cholera with Toxoid.**—*Wien. Klin. Woch.* 1928. Mar. 8. Vol. 41. No. 10. pp. 337-338. [State Serotherap. Inst., Vienna.]]

The El Tor vibrio, which both agglutinated with cholera serum and gave the Pfeiffer reaction, was originally shown by Kraus to be haemolytic and to produce an acute toxin. An antitoxin was obtained to this toxin which neutralized the toxins of El Tor, cholera and other vibrios, so that it could be designated a panvibrio-antitoxin. This antitoxin was used by Kraus in a cholera epidemic in 1908. The

present research has shown that the toxin of the vibrio Kadiköj, treated with 0.2 to 0.5 per cent. formalin at 38° C. for a few days, so as to convert it into toxoid, is detoxicated and still remains anti-toxigenic. Guinea pigs and rabbits subcutaneously inoculated with small doses of toxoid and tested 8 days later intravenously with one or more lethal doses of toxin, remained alive while control animals died in a few minutes. Further trials were made to determine whether previously treated guinea pigs were also immune to infection and success attended the experiments with one or more lethal doses of El Tor and cholera vibrios, intraperitoneally injected. The basis for protective inoculation against cholera was thus established. It was also shown that this toxoid was without marked local or general reaction in man in doses of 0.5 to 1.5 cc. and that specific agglutinins were produced to cholera vibrios. It remains to test in practice whether the antitoxic plus anti-infectious immunity, developed to this toxoid, gives better results than those obtained by the inoculation of killed vibrios alone.

W. F. Harvey.

KRAUS (R.) & KOVÁCS (N.). Ueber die experimentellen Grundlagen einer präventiven Schutzimpfung gegen Cholera mittels Toxoiden. I. Mitteilung. [**Experimental Basis of Protective Inoculation against Cholera with Toxoid.**—*Ztschr. f. Immunitätsf. u. Experim. Therap.* 1928. Mar. 27. Vol. 55. No. 3-4. pp. 316-323.]

It is immaterial for the argument here set out whether the atypical vibrios El Tor and Kadiköj are to be regarded as true cholera or as paracholera. The important facts are that animals actively immunized with their toxins are protected against the corresponding toxin, against the toxins of cholera and other vibrios and are also immune to infection with these vibrios. The next step was to obtain toxoids to these toxins and immunize with toxoid instead of toxin. A 10-day bouillon culture of Kadiköj or El Tor, centrifuged to clear, carbolyzed at 0.5 per cent. and then, after 24 hours, formalinized at 0.5 per cent., was kept 5 days at 37° C. Rabbits survived injection of 1 cc. of this toxoid intravenously. A rabbit was injected subcutaneously with successive doses of 0.5, 1, 1, and 2 cc. toxoid and survived intravenous injection of 1 cc. toxin 8 days later. A guinea pig received 1 cc. toxoid subcutaneously, was tested one month later intraperitoneally with a half loop of virulent El Tor agar culture, and survived. The same result was obtained with cholera instead of El Tor infection. All experiments were controlled. It remains now to test in man whether active toxoid immunization or a combined vaccine and toxoid immunization will give improvement over previous results.

W. F. Harvey.

JONES (E. L.). **Anticholera Vaccination of the United States Marines at Shanghai, China, with Notes on Local Conditions.**—*U.S. Nav. Med. Bull.* 1928. Apr. Vol. 26. No. 2. pp. 438-451. [3 refs.]

This is a long official report by the Commander of the Medical Corps, U.S. Navy. It deals with sanitary conditions in Shanghai and with many other diseases besides cholera. For the U.S. forces the inoculation of the Fourth Regiment, with a strength of 1,500 men, was completed on June 29, 1927, and at the same time 190 men of the

brigade troops were given their first injection. A number of the members of officers' families residing in Shanghai came to the regimental hospital and requested anticholera vaccination. The vaccine was made in the laboratory of the Municipal Health Department. Two strains of *V. cholerae* were used, one obtained from the Lister Institute, London, the other a local strain isolated in 1925. The vaccine contained approximately 4,000,000,000 to each cc. It was tested in the Municipal Jail and serum taken from the convicts 10 days after the second injection showed agglutination in dilutions ranging from 1 to 80 to 1 to 2,000. No agglutinations were made with sera from the marines owing to want of time. The great majority of the men showed no reaction and no serious reactions were encountered in any of the patients. Vaccination should certainly be repeated every cholera season.

J. H. T. W.

MALLIK (K. L. Basu). **The Value of Inoculation in the Prevention of Cholera.**—*Indian Med. Gaz.* 1928. Feb. Vol. 63. No. 2. pp. 77-79.

During the last six years the author has been using anticholera vaccine for the prevention of cholera among Europeans and certain classes of Indian employees of a jute mill near Calcutta. In all 420 inoculations were carried out during the six years, distributed among a total personnel and establishment of 280. Among these 280 there were 32 cases of cholera in six years, but in every instance the patient was a non-inoculated person. The following table gives a summary of the series :—

SUMMARY OF CHOLERA INOCULATIONS.

Year.	Europeans.	Indians.			Total.	Incidence of clinical cholera in the inoculated.	
		Middle or Babu Class.	Menials and Labour Contacts.	Boat Crew.		Inoculated persons including boat crew.	Uninoculated boat crew only.
1922	38	7	5	0	50	0	—
1923	7	0	3	25	35	0	1
1924	0	0	0	0	0	0	1
1925	30	48	15	41	134	0	7
1926	5	4	0	0	9	0	16
1927	33	50	82	27	192	0	7
	113	109	105	93	420	0	32

J. H. T. W.

ROSS, (W. C.). **The Transmission of Cholera.**—23 pp. 1928. Jan. Patna: Supt., Govt. Printing, Bihar and Orissa.

This is an interesting and readable pamphlet, but it contains nothing new.

J. H. T. W.

HEALTH. Melbourne. 1928. Jan. Vol. 6. No. 1. pp. 17-24.—Report on an Outbreak of Cholera on Shipboard.

ROSS (W. C.). The Epidemiology of Cholera.—*Indian Jl. Med. Res.* 1928. Apr. Vol. 15. No. 4. pp. 951-964. With 6 charts. [6 refs.]

RUSSELL (A. J. H.) & SUNDARARAJAN (E. R.). The Epidemiology of Cholera (IV).—*Indian Jl. Med. Res.* 1926. Oct. Vol. 14. No. 2. pp. 409-449. [35 refs.] [*v. Bull. of Hyg.* Vol. 3. p. 357.]

TAKANO (Rokuro), OHTSUBO (Itsuyo) & INOUYE (Zenjuro). Les épidémies de choléra au Japon.—*Bull. Office Internat. d'Hyg. Publique.* 1928. Feb. Vol. 20 No. 2. pp. 243-258.

TOMB (J. Walker). Hypertonic Saline Injections in Cholera.—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1927 Nov. 25. Vol. 21. No. 3 pp. 199-202. [12 refs.]

TOURNIER (E.). Remarques sur des cas de choléra observés au camp de l'arsenal de l'Est (Chine du Nord).—*Bull. Soc. Path. Exot* 1928. Apr. 18. Vol. 21. No. 4 pp. 295-298

SPRUE.

WEISS (Charles). **A Review of the Recent Literature on Tropical Sprue.**—*Porto Rico Rev. of Pub. Health & Trop. Med.* 1927. Oct. Vol. 3. No. 4. pp. 150–161. [43 refs.] [School of Trop. Med., Univ. of Porto Rico.]

It is difficult to summarize this review as it consists almost entirely of a resumé of the papers already adequately reviewed in this *Bulletin*. The main portion is concerned with the exact relationship of *Monilia psilosis* to sprue and the balance of evidence would appear to be unfavourable to its acceptance. The author remarks that the finding of *M. psilosis* in the digestive tract of a few or of all cases of sprue does not prove its aetiological relationship. For, are not *Bact. coli* and *B. subtilis* also universally present? And, can we not isolate toxins from *Bact. coli* and kill guineapigs with it by intraperitoneal and intravenous injection in massive doses?

The investigator must not lose sight of the fact that experimental moniliasis in guineapigs or pyaemia in rabbits produced by intraperitoneal injections of massive doses of living cultures of monilia is by no means equivalent to sprue in man.

P. H. Manson-Bahr.

THAYSEN. Die nicht tropische Sprue. [**Non-Tropical Sprue.**]—11 pp. 8vo. [n.d.; n.p.]

After detailing cases of sprue or a sprue-like disease previously observed in Northern European countries, the author relates that in 1922 he saw his first non-tropical sprue patient, who had never been outside the confines of Europe, and in the following year three others in denizens of Copenhagen. From these and other cases recorded in Norway it can be concluded that the practical physician cannot ignore the existence of this malady. The symptomatology of non-tropical sprue is very similar to that of the tropical form. The same chronic diarrhoea, remarkable emaciation and asthenia are observable. In two cases the diarrhoea was of a truly remarkable character: the light stools measured over three litres in the twenty-four hours, were liquid, greenish-coloured and frothy—like dirty soapy water, as the patient explained. The liver dullness is considerably diminished, which is probably ascribable to the loss of fat in that organ.

Stomatitis and glossitis was noted only in two cases and then only during the acute diarrhoeic periods. In two cases the anaemia was of the pernicious type and in two others of a slighter degree. The chief distinction between non-tropical sprue and pancreatic fat-diarrhoea lies in the increased nitrogen excretion associated with the latter. It is possible that the severe anaemia and general symptoms of non-tropical sprue are due to an avitaminosis.

These cases of non-tropical sprue reacted to a milk dietary in much the same manner as true sprue; on the other hand raw fruit or raw meat was by no means so beneficial.

P. H. M-B.

SOKHEY (S. S.) & MALANDKAR (M. A.). **Pancreatic Function in Sprue.**—*Indian Jl. Med. Res.* 1928. Apr. Vol. 15. No. 4. pp. 921-933. [18 refs.] [Haffkine Inst., Bombay.]

Following upon the work of Hamilton FAIRLEY, F. P. MACKIE, M. A. MALANDKAR, and others, on the analysis of fat in the faeces of sprue cases [this *Bulletin*, Vol. 23, p. 795], these workers have investigated the pancreatic function in sprue still further. The previous analysis by CAMMIDGE has been found unreliable. The drying of faeces disturbs the relationship between fatty acids and combined fats. The inaccuracy of the method is of such magnitude as to render it useless for clinical purposes.

Saxon's method of analysis of faeces in fresh condition, without drying, was employed; all patients were on a full milk dietary. According to Fowweather's figures the criterion of fat analysis of faeces for diagnostic purposes is: (1) Any specimen in which the total fat amounts to more than 28 per cent. of the total dry matter is probably abnormal. (2) Any specimen in which the neutral fat exceeds 12 per cent. of the total dry matter or 60 per cent. of the total fat content should be suspected of showing evidence of deficient fat splitting. (3) Any specimen in which the total of split fat exceeds 20 per cent. of dry matter, or 75 per cent. of the total fat should be suspected of showing evidence of deficient fat absorption. In a series of 14 sprue cases, total fat was very much in excess in all cases but two, and neutral fat did not exceed 60 per cent. of the total fat except in one. Split fat formed 75 per cent. of the total fat. There is, therefore, no evidence of pancreatic deficiency and fat absorption seems to be defective.

As a result of this study the authors are convinced that fat analysis of the faeces in sprue does not disclose anything that is peculiar to the disease, and cannot help in diagnosis; it is therefore quite unnecessary as a routine measure. Defective fat absorption may be due simply to the hurrying along of the bowel contents. Possibly the high fat content of sprue faeces may be due to the ingestion of milk. The fat composition of faeces of 17 bed-ridden patients on a milk diet suffering from diseases other than sprue gave almost exactly the same figures.

Since it is impossible to obtain definite information of the activity of the pancreas by this method the presence of pancreatic enzymes in the duodenal contents has been determined. The examination showed that diastase, trypsin and lipase were present in normal amounts in the duodenal contents of patients suffering from sprue.

P. H. M-B.

SILVERMAN (Daniel N.). **Sprue: Extended Studies with Especial Reference to Pancreatic Digestion.**—*Southern Med. Jl.* 1927. Oct. Vol. 20. No. 10. pp. 762-764. [School of Med., Tulane Univ., New Orleans, La.]

The four cases of sprue here recorded developed in permanent residents in Louisiana. Three of the patients presented the classical syndrome of sore mouth, anaemia, diarrhoea and loss of weight, while the fourth case was atypical. Though the cases resemble pernicious anaemia in many respects the author is insistent that the normal and hypernormal quantities of hydrochloric acid in the gastric secretion of sprue makes differentiation possible. These cases showed normal digestive activities of the pancreatic ferments as determined by analysis of the duodenal contents.

P. H. M-B.

KRJUKOFF (A.). Anämie bei Sprue. [*Anaemia in Sprue.*]—*Folia Haematologica*. 1928. Jan. Vol. 35. No. 4. pp. 329–352. [2 refs.] [Third Med. Clinic, State Central Asiatic Univ., Tashkent.]

In the anaemia of sprue the colour index is one or slightly below one. The red cells show anisocytosis with microcytes and macrocytes; poikilocytosis is usually present. The type of anaemia is normochromic with degeneration picture, in which *regeneration* phenomena, such as polychromasia and azurophilia, are wanting. The more long-standing the case, the more marked are the blood changes. In many instances under the influence of treatment the character of the anaemia alters; signs of regeneration make their appearance even in the most severe forms with a colour index of 1.4.

There can be no question that the type of sprue anaemia approximates to that of Addisonian anaemia. Macrocytosis and anisocytosis is not, however, so marked. The differential diagnosis may be very difficult, for diarrhoea may be present in Addisonian anaemia or achylia in sprue. The hyperchromic type of anaemia persists in the former even during remissions. Without the examination of the bone marrow itself it is impossible to explain satisfactorily the hyperchromia of sprue. Sections of the blood-forming organs at autopsy are of lesser moment, as in such a long-standing disease all kinds of secondary infections, notably bowel ulcerations, come into play. The red bone marrow of the ribs can be investigated at biopsy. In all such cases the bone marrow was red and showed megaloblastic blood formation, even with a moderate anaemia of three to three and a half million red corpuscles. As a rule there is a megaloblastic reaction with the production of lymphoid erythroblasts of all sizes, including normoblasts and megaloblasts. Even in the early stages of sprue with a red cell count of four and a half millions and a colour index of 0.8 megaloblasts were demonstrated in the bone marrow at biopsy. The resistance of the erythrocytes ranges within normal limits, the minimal amount of resistance being about 48. The leucocytes are either normal in numbers or subnormal: In severe cases there may be a leucopenia of 3,000. In cases which are improving under treatment the leucocytes gradually return to normal numbers. The leucocyte formula shows invariably a rise in the lymphocytes which may reach 56 per cent. The polymorphonuclears show an Arnetz index to the left. The bone marrow exhibits a myeloid reaction.

The blood serum invariably gives an indirect positive Van den Bergh reaction. This appears to be dependent upon increase of bilirubin in the duodenum, and a pathological increase of urobilin in the urine. The anaemia of sprue is haemolytic in nature.

P. H. M-B.

KRUKOW (A. N.). L'anémie dans la diarrhée de Cochinchine. [*Anaemia in Sprue.*]—*Pensée Méd. d'Usbekistane*. Tashkent. 1927. Oct. Vol. 2. No. 1. French summary p. 126. [In Russian pp. 28–36.]

Sprue anaemia is a haemolytic anaemia closely allied to that of pernicious anaemia. The changes of the red cells are degenerative in nature; in the red bone marrow a megaloblastic reaction is noted.

As regards the leucocytes, a leucopenia with a relative increase of lymphocytes and a reduction of the mononuclears and eosinophiles is a feature.

P. H. M-B.

SOKHEY (S. S.), GOKHALE (S. K.), MALANDKAR (M. A.) & BILLIMORIA (H. S.). **Liver Function in Sprue.**—*Indian Jl. Med. Res.* 1928. Jan. Vol. 15. No. 3. pp. 553-563. [23 refs.] [Biochem. Unit, Haffkine Inst., Bombay.]

The present study was undertaken to see if modern functional tests would throw any light on the efficiency of liver in sprue. Thirteen typical cases of the disease were studied. The functional tests were as follows :—

(a) The laevulose tolerance test, based on the relation of the liver to carbohydrate metabolism.

(b) The Van den Bergh reaction, depending upon the secretion of bile by the liver.

(c) Nitrogen partition of blood, based on the relation of the liver to protein metabolism.

(d) Bromosulphalein dye test of Rosenthal and White.

All tests were carried out on each patient at one time. The patient was prepared as for glucose tolerance test, i.e., he was given no food after the evening meal. After 50 gm. of laevulose a rise in blood sugar of 18 mgm. coupled with the non-return of the curve to fasting level in 1½ hours is indicative of abnormality. Judged by the test, seven out of thirteen cases of sprue showed abnormality.

In six cases an increase of the serum bilirubin was noted, as shown by the Van den Bergh reaction, indicating an increased destruction of erythrocytes rather than defective function of the liver.

Nitrogen partition of blood.—Normally urea nitrogen constitutes 40-50 per cent. of the non-protein nitrogen content of the blood. Out of the eleven cases in which nitrogen partition was studied, four showed urea nitrogen below 40 per cent. of the non-protein nitrogen.

The dye test.—The bromosulphalein dye test is a liver function test of a type different from the other three tests. Extraction of the dye from the blood-stream depends upon the liver alone.

Out of thirteen cases tested, dye retention was observed in two cases only. Less than 5 per cent. retention is too small to be significant.

The investigation, therefore, goes to show that in sprue the liver is not affected to such an extent as to show impairment by liver function tests.

P. H. M-B.

REED (Alfred C) & ASH (J. E.). **Atypical Sprue.**—*Arch. Intern. Med.* 1927. Dec 15. Vol. 40. No. 6. pp. 786-799 [3 refs.]

The diagnosis of sprue is still unsatisfactory; diagnosis based on the characteristic diarrhoea, stomatitis and afebrile course excludes many early cases which later prove to be sprue. In regard to etiology, the idea of a gastrointestinal toxin of a group type seems a logical working hypothesis.

The greater part of the paper is occupied by clinical histories of eight cases of atypical sprue, seven of which were contracted in the tropics, notably in the Philippines, though one patient resided in

Southern California. All were males between 40 and 60 years of age. Sore mouth and tongue, diarrhoea and anaemia were present in all; achlorhydria in seven. Central nerve symptoms were found in three and peripheral neuritis in two. Four patients died of the disease after a duration of 6 months to 4½ years.

In the whole group sore mouth and diarrhoea were prominent features, though these symptoms were more or less remittent; and while diarrhoea usually occurred first, the sore mouth developed early and roughly synchronized with the bouts of diarrhoea. A definite anaemia of the pernicious type was seen in all. It would appear that the sprue "toxin" affects the blood in most cases early in the disease. The majority of cases showed evidence of pancreatic deficiency in the stools. In three cases definite implication of the nervous system was noted. In one only definite and consistent nervous symptoms approached those of subacute degeneration of the cord. It is concluded as a result of this study that there exists a clinical entity, combining gastrointestinal disturbance like that of sprue, an anaemia approaching the pernicious type and nervous phenomena characteristic of subacute combined degeneration of the cord and of the peripheral nerves. Any combination of these groups may be found associated. As regards etiology, Ashford's *Monilia psilosis* was inconstant in these cases and the authors do not accept its pathogenicity as established.

[It is not clear to the reviewer why the description "atypical" is applied to what appear to have been eight very typical instances of the disease. The description of the involvement of the nervous system during life and at autopsy is vague and its exact significance doubtful.]

P. H. M-B.

COOKE (W. E.). **A Case of Haemolysis following Blood Transfusion in Sprue.**—*Irish Jl. Med. Sci.* 1927. Nov. 6th Ser. No. 23. pp. 678-680.

In blood transfusion there is always a small risk of haemolysis or of anaphylactic symptoms supervening, even when every precaution regarding compatibility has been taken.

The paper centres on the record of a serious case of sprue in which blood transfusion by the citrate method was performed. The patient was found to belong to Group 3 and a suitable donor was procured. Directly the needle was inserted into the vein and blood permitted to flow the patient showed signs of anaphylaxis with severe pain in the back, liquid diarrhoea and vomiting of white mucoid fluid. No more blood was injected. Symptoms were exacerbated by the injection of four minims of Liq. adrenalin 1:1,000 solution. Suppression of urine over a period of 26½ hours supervened. The first specimens of urine passed contained albumin, red blood corpuscles, haemoglobin, and hyaline and blood casts.

Subsequent and steady progress in the blood condition was maintained after this reaction so that by the 41st day the number of red cells were 4,460,000 per cmm. and the haemoglobin 85 per cent.

No explanation is forthcoming as to the cause of the anaphylaxis in this case; no departure in technique was made from that used successfully on previous occasions, while the patient had never previously had an injection of serum or protein of any sort.

Blood transfusion is now recognized as a most useful method of treatment in severe cases of sprue [*ante*, p. 59]; it would appear that the benefit gained does not depend upon the quantity of blood injected, but on the stimulation of the blood-forming elements. When pyrexia follows transfusion the results appear to be better. The author suggests that "protein shock" treatment may be given a trial in sprue.

P. H. M-B.

BROWNE (Donovan C.). **The Effects produced in the Rabbit by Feeding Cultures of *Monilia psilosis*.**—*Proc. Soc. Experim. Biol. & Med.* 1927. June. Vol. 24. No. 9. pp. 873-875. [1 ref.] [Dept. of Path., Tulane Univ. School of Med.]

From a typical case of sprue cultures of *Monilia psilosis* were isolated both from the oral lesions and from the stools. These cultures corresponded in every manner to those described by ASHFORD. Other forms of yeast obtained from fermenting stools and not conforming culturally to the true *Monilia psilosis* were employed as culture suspensions in feeding experiments upon control animals.

Cultures of *M. psilosis* were incubated for ten days in 4 per cent. dextrose bouillon. Two rabbits injected intravenously died in approximately 24 hours and from each a pure culture of the *Monilia* was recovered from the heart's blood, kidneys and liver. Nine rabbits were fed with a similar culture and of these six died between the 31st and 61st day. In the majority deposits of pigment were noted in the spleen and liver. Cultures from the intestinal tract yielded growth of *M. psilosis*. Six control rabbits were treated in a similar manner except that cultures of other saccharomycetes were employed. They remained normal.

These experiments indicated that *M. psilosis* is pathogenic for rabbits when injected intravenously and when given by feeding. The clinical picture produced in animals of the feeding experiments is quite constant, although no specific syndrome corresponding to clinical sprue occurred. The only manifestations at all related to this clinical entity was loss of weight and some anaemia.

P. H. M-B.

RABE (Helen). **Diet in Tropical Sprue. With a Note on the Effect of Liver in Certain Sprue Cases.** By E. A. BAUMGARTNER.—*Clifton Med. Bull.* 1928. Apr. Vol. 14. No. 2. pp. 55-61. [5 refs.]

At Clifton Springs Sanitarium a general type of diet satisfactory to sprue patients has been tried. Most patients develop a dislike for butter, sugar and starches when they find they do not agree.

When the tray is returned by the patient with no food left, the diet is increased up to a point when the patient is satisfied. Fresh fruits are found best, but when not in season, unsweetened canned fruits are used, saccharine being employed in place of sugar. Cottage cheese is given once or twice daily, according to the amount of protein allowed for the patient.

The foods avoided are: cereals, bread, crackers, rice, navy beans, potatoes, all sugars, fried foods and all desserts.

After the patient has returned to his home, it is advisable that starches and sugars be omitted from his dietary from three to six

months. The ability to eat bread, potatoes and sugar without a relapse may be taken as a test of cure. A typical day's diet is given as follows :—

Breakfast.	grms.	Dinner.	grms.	Supper.	grms.
Orange ...	120	Lamb chops ...	100	Soft boiled egg ...	2
Cottage cheese ...	70	Turnips ...	50	Beets ...	50
Soft boiled egg ...	2	String beans ...	50	Cauliflower ...	100
Bacon ...	15	Lettuce ...	15	Cottage cheese ...	50
Skimmed milk ...	220	Fruit salad ...	70	Head lettuce ...	50
		Whipped cream ...	15	Celery hearts ...	50
		Strawberries ...	100	Fresh peaches ...	120
		Skimmed milk ...	220	Skimmed milk ...	220
Total calories ...		1528.7.			

On this dietary the blood picture often improves rapidly and the blood count increases by one to one and a half million red cells. In two cases of sprue with a severe anaemia of the Addisonian type liver has been given as part of the protein with favourable effect.

P. H. M-B.

BLOOMFIELD (Arthur L.) & WYCKOFF (Harry A.). **Remission in Sprue following High Liver Diet—Case Report.**—*California & Western Med.* 1927. Nov. Vol. 27. No. 5. pp. 659-660. With 1 chart. [5 refs.] [School of Med., Stanford Univ., San Francisco.]

The cause of pernicious anaemia and of sprue being at present equally obscure and these diseases being similar in several important features, it was decided to use a diet containing large amounts of liver. The patient's sprue, of average severity, was contracted in the Philippines. The diagnosis was made on the character of the diarrhoea and the buccal lesions. After three days of observation and rest in bed, he was placed on the high liver diet of MINOT and MURPHY. No drugs or other measures were used. There was prompt improvement. In four days the ulcers on the tongue were entirely healed; the stools immediately became brown and less bulky and within a week were pasty. During convalescence, apart from high liver diet, and dilute hydrochloric acid with meals, no treatment was undertaken. Within three months he felt perfectly well and within two months had gained 25 lbs. The promptness and great degree of improvement after an uninterrupted downhill course for fourteen months suggest that in this instance the liver diet was the effective agent. The paper is illustrated by graphs which depict in a striking manner the decrease of the diarrhoea, increase of weight and progressive improvement of the blood.

P. H. M-B.

ZADEK (Ernst.). Ueber Sprue. [**Sprue.**]—*Med. Klin.* 1928. May 18. Vol. 24. No. 20. pp. 776-777. [9 refs.] [Municipal Hosp., Charlottenburg-Westend.]

This paper makes no pretence of adding anything material to our knowledge of sprue. It describes in some detail the typical course of sprue in a German subject who contracted the infection in Hankow.

P. H. M-B.

TROPICAL DERMATOLOGY.

DES LIGNERIS (M.). **A Note on Cases of Mycetoma in Natives from the Northern Transvaal.**—*Jl. Med. Assoc. S. Africa.* 1928. Jan. 14. Vol. 2. No. 1. pp. 10–11. [8 refs.]

Ten cases (all males) have been observed by the author during the last 15 years. These included 1 pale, 7 black and 2 red varieties of the infecting organisms. Treatment by drugs given by either the mouth or intravenously was unsuccessful. Amputation was usually indicated. For some early cases and for those who refused amputation considerable improvement was produced by removal under anaesthesia of the worst affected areas, scraping away as much as could be removed by the curette, packing the open wound with iodoform gauze and subsequent energetic X-ray therapy. The histological picture varied according as the examined area contained (a) the fungus alone, or (b) a mixed bacterial infection. The endothelial and giant cells with little fibrous tissue formation in (a), and granulation tissue with numerous white cells in (b) would "seem to explain how an agent which tends to increase lymphocytic and fibroblastic reaction, as does radiotherapy, can have a beneficial effect."

W. Jenkins Oliver.

MONTPELLIER (J.) & CATANEI (A.). Formes cliniques, histologie pathologique, parasitologie et diagnostic des mycétomes observés en Algérie. [**Clinical Forms, Histology, Parasitology and Diagnosis of the Mycetomas observed in Algeria.**]—*Arch. Inst. Pasteur d'Algérie.* 1927. Dec. Vol. 5. No. 4. pp. 489–508. With 6 figs. on 3 plates & 4 text figs. [3 refs.] [Path. Anat. Lab. Faculty of Med. & Pasteur Inst., Algiers.]

Of the 12 published cases of mycetomas in Algeria, 10 were of the foot, 1 of the arm, and 1 of the jaw. They may be separated into two clinical groups: (1) circumscribed tumours; and (2) "Madura foot," which is the commonest type. Histologically the lesions develop in three stages: (1) mycetomic nodule; (2) mycetomic tumour; and (3) Madura foot. The first two are due entirely to the fungus, but in the third there are also lesions due to secondary infections with bacteria.

The fungi found in the different cases are:—*Nocardia* [*Actinomyces*] *madurae* (H. Vincent 1894) in seven cases; *Scedosporium apiospermum* (Saccardo 1911) 2 cases; *Madurella mycetomi* (Laveran 1902) 1 case; and *Glenospora clapiéri* (Catanei 1927) in the 1 maxillary case.

The differential diagnosis of mycetomas from pseudo-mycetomas of tuberculous, syphilitic, or mixed origin is described, and chiefly depends on the presence of "grains" in true mycetomas.

P. Tate.

GUERRA (A. Reina). Mycétome actinomycosique à grains jaunes à San Salvador. [**Actinomycotic Mycetoma with Yellow Grains at San Salvador.**]—*Ann. Parasit. Humaine et Comparée.* 1927. Oct. 1. Vol. 5. No. 4. pp. 344–355. With 13 text figs.

The mycetoma involved the left foot of a man aged 65, and was of 2 years' duration. The whole foot was involved, and numerous

fistulae opened to the surface by crateriform apertures. Muscles and tendons appeared not to be attacked; but all the bones were more or less decalcified or destroyed. Numerous mammillated grains, clear yellow in colour, and 50 to 200 microns in size, were present in the lesions. They were composed of masses of fine, aseptate, non-nucleated filaments, 0.5 microns in diameter. No clubs or spores were found. Only the central zone of the grains stained with gram.

Pure cultures could not be obtained from the grains by the ordinary technique, owing to bacterial growth; but were readily obtained on medium first impregnated with a dilute solution of gentian violet. The colonies developed were 1 to 1.5 mm. in diameter, spherical or ovoid, white in colour, and formed of fine radiating hyphae. The optimum temperature for growth is 37° C. Neither gelatin nor blood serum is liquefied; and scarcely any growth takes place under anaerobic conditions.

The mycelium is composed of fine aseptate, non-nucleated hyphae 0.5 microns in diameter, which branch freely and have terminal swellings. The hyphae break up into bacilliform bodies 3-7 microns long, but no spores are formed. They stain with gram but are not acid fast. In the general characters the organism appears to be more or less intermediate between *Cohnistrepthothrix* and *Actinomyces*.

Subcutaneous inoculation of guineapigs and rabbits with pus containing the grains or with cultures was negative. Scarification of the paws of guineapigs and covering the wounds with pus was positive in one case, and resulted in the formation of a tumour which contained numerous grains. These grains had clubs, unlike those developed in man.

Treatment with iodine internally and lugol externally did not prove effective, and amputation was performed.

P. Tate.

HARROLD (Charles C.). **Madura Foot in a Georgia Negro.**—*Southern Med. J.* 1927. Aug. Vol 20. No. 8. pp. 654-655.

What is considered to be the first case of Madura foot with black grains occurring in a native born American, is described briefly. Partial amputation and treatment with mercurochrome has not proved curative. This case of Madura foot brings the total for the whole of America up to 22.

P. Tate.

DA FONSECA (O.) & LEÃO (A. E. de Arêa). *Scedosporium apiospermum*, [*Scedosporium apiospermum* : a Fungus causing Mycetoma in Italy champagne producteur de mycétomes en Italie et au Brésil.—and Brazil.]—*C. R. Soc. Biol.* 1927. Nov. 18. Vol. 97. No. 31. pp. 1347-1348. [Oswaldo Cruz Inst., & Dermat. Clinic, Faculty of Med., Rio de Janeiro.]

Cultures of *Scedosporium apiospermum* were obtained from a case of mycetoma with few clear yellow grains about 3 mm. in diameter. Sclerotia were formed in old cultures, and three kinds of spores were developed. The spores are: (1) Pyriform conidia [aleuries] described by previous authors; (2) fusiform recurved spores borne singly and terminally; and (3) numerous chlamydospores, intercalary or terminal, and in the latter case borne singly or in chains of 5-6.

P. Tate.

BRADFIELD (E. W. C.) & VASUDEVAN (A.). **Mycetoma.**—*Indian Med. Gaz.* 1927. Nov. Vol. 62. No. 11. pp. 633-634. With 2 text figs. [Govt. Med. Hosp., Madras.]

Brief mention of a case affecting the right foot treated by excision of the great toe and tarsal bone. The case showed in addition two pea-sized nodules in the subcutaneous tissue above the right thumb and below the right malleolus. Section of the nodules showed a granuloma contained in a distinct fibrous capsule, with numerous multinucleated giant cells (not unlike myeloid cells), epithelioid and spindle cells surrounding an abscess with the fungus in its centre.

W. J. O.

HALLORAN (C. R.). **Mycetoma in an American Negro. Report of a Case.**—*Arch. Derm. & Syph.* 1927. Nov. Vol. 16. No. 5. pp. 611-612. [10 refs.]

Concerns an American negro in whom the disease, of 4 years' duration involving the left foot, had commenced while he was living in Florida. Melanoid granules obtained from the pus gave cultures of a streptothrix. It is noted that only 30 cases had been reported previously in America, of which one only had been of the melanoid variety.

W. J. O.

CHRISTOPHERSON (J. B.). **On the Treatment of the Actinomycosis Type of Mycetoma.**—*Proc. Roy. Soc. Med.* 1928. Jan. Vol. 21. No. 3. pp. 471-474 (Sect. Trop. Dis. & Parasit. pp. 25-28). With 2 text figs.

Report of a case of actinomycosis of the parotid region, in a male aged 26 years, cured after 2½ years' treatment by potassium iodide. This was given continuously over 3 periods of 7, 6 and 5 months respectively, during the first two periods in 180 grain doses and during the third in 240 grain doses per diem. X-ray exposures were without effect, while the action of the radium treatment adopted could not be estimated by the writer.

W. J. O.

DA MATTA (Alfredo). *Sterigmatocystis tropicalis* n. sp. de fungo patogenico para o homem. [*Sterigmatocystis tropicalis*, a New Species of Fungus Pathogenic for Man.]—*Bol. Inst. Brasileiro de Ciencias.* Rio de Janeiro. 1928. Mar. 15. Vol. 3. No. 3. pp. 51-54. With 2 figs.

A labourer, 18 years of age, who worked barefoot on a plantation, was pecked by a fowl on the dorsum of the right foot. After washing the wound he returned to his work. A few days later the site became inflamed and painful to pressure. After 10 days pus appeared, the opening increased in size and, owing to the pain, he had to cease work. The ulcer continued to spread and after 10 months measured 5 cm. in diameter; the base was indurated and the surrounding tissues nodular to the touch. Scraping of the ulcer and the nodules showed the presence of a mould which belonged to the genus *Sterigmatocystis*, but differed from the known species and has been named *S. tropicalis*. Cure was obtained by the local action of sulphate of copper, starting with 0.5 gm. per cent. and increasing to 1.5 gm. per cent. in distilled water.

H. Harold Scott.

DA FONSECA, Filho (Olympio), LEÃO (A. E. de Arêa) & PENIDO (J. C. Nogueira). [In Portuguese & English.] Mycose de typo ulceronodular, semel hando a esporotrichose e produzida por uma especie de cogumelo do genero *Hormodendrum*. **Ulceró-Nodular Mycosis, Similar to Sporotrichosis and caused by an *Hormodendrum*.**—*Sciencia Med.* 1927. Oct. Vol. 5. No. 10. In Portuguese. pp. 563–573. With 9 text figs. & 4 figs. on 2 plates. In English pp. 574–580.

—, — & —. Mycose de type ulcéro-nodulaire, semblable à la sporotrichose et produite par *Hormodendrum langeroni*.—*C. R. Soc. Biol.* 1927. Vol. 97. No. 36. pp. 1772–1774. With 2 text figs. [Oswaldo Cruz Inst., Rio de Janeiro.]

The patient, a white Brazilian coachman, aged 23, suffered from ulcerative lesions on the right hand, forearm and arm. The lesions were arranged along a line running from the posterior surface of the hand to the middle of the anterior surface of the arm, and simulated sporotrichosis. The ulcers were somewhat deep, covered by granulating tissue and yellowish scabs, and surrounded by a hyperaemic and somewhat cyanotic area. With slight pressure pus could be expressed from beneath the scabs.

Pus obtained by aseptic puncture gave pure colonies of a fungus on Sabouraud's maltose agar. Young colonies are greenish, but later become darker and almost black. The surface is irregular and has many radial and concentric furrows. A grey pleomorphic down is developed. The cultural characters on various other media are briefly described. The aerial mycelium is formed of elongated, septate, branched, hyphae. The conidiophores are erect and branched or unbranched; and the branches may be formed of single cells or of several articulated cells. The terminal cells bear a number of tubercles or disjunctors, on which are borne clavate or sub-cylindrical intermediate cells which give rise distally, by transverse division, to chains of ovoid or spindle-shaped conidia, at each end of which disjunctors are present. Sometimes the conidia are bicellular. Vegetative hyphae are 2–4 microns in diameter. Intermediate cells, 7–12 by 3–4 microns. Disjunctors, 1 micron high. Conidia, 2.5–6 by 2.5–14 microns; average about 7–8 by 4–5 microns.

The fungus is considered to be a new species of *Hormodendrum* and is named *Hormodendrum langeroni*. n. sp.

P. Tate.

MONTPELLIER (J.) & CATANEI (A.). Mycose humaine due à un champignon du genre "*Hormodendron* : *H. Algeriensis* nov. sp." [Mycosis due to a New Species of *Hormodendrum* : *H. algeriensis*.]—*Ann. Dermal. et Syph.* 1927. Nov. 6 Ser. Vol. 8. No. 11. pp. 626–635. With 5 text figs. [2 refs.]

This mycosis was of about 10 years duration and consisted of polymorphic eruptions involving the right leg and instep. Prolonged local treatment with yellow precipitate of mercury, together with injections of acetylarsan was ineffective; as was treatment with potassium iodide. Three injections of 2 cc. of Propidon led to noticeable improvement, and were followed by treatment with bismuth and mercury; nearly complete cure resulted in a few months. Six months later the patient returned with a relapse and renewed bismuth

treatment was unavailing. Subcutaneous injection of the filtrate from culture media of a fungus isolated from the lesions resulted in improvement; but the patient left the dispensary after a short time and was lost sight of.

Histologically the lesions resembled those of sporotrichosis. A fungus was present in the form of spherical or ovoid cells 2-10 microns in diameter, rarely arranged in chains. Cultures of a fungus were obtained on Sabouraud's glucose medium, and were identified as a new species of *Hormodendrum* which is named *H. algeriensis*.

Subcutaneous inoculation of a rabbit with a culture led to the formation of a large abscess, in the pus of which the fungus was present and from which it could be recultivated. Intravenous inoculation of a pigeon and intraperitoneal inoculation of a mouse were negative.

Sporo-agglutination and fixation reaction were negative.

P. Tate.

PIJPER (Adrianus) & PULLINGER (B. Davidine). **An Outbreak of Sporotrichosis among South African Native Miners.**—*Lancet*. 1927. Oct. 29. pp. 914-915. With 2 text figs. [3 refs.]

Sporotrichosis has hitherto been unknown in South Africa. This outbreak involved 14 native miners in one mine. In 5 cases a fungus was isolated, and was identified as *Rhinochidium beurmanni*. The other cases were diagnosed on clinical and serological grounds, and in consequence of their yielding readily to treatment with potassium iodide. High doses of potassium iodide resulted in cures in 2-3 weeks in all cases.

A "primary" sore was present in nearly all cases, in the form of a localized ulceration of the finger or shin. In 10 cases the lesions were confined to one arm, sometimes extending as high as the shoulder; and in the other 4 cases the primary sore was on the shin, and the lesions extended up the leg.

P. Tate.

DA FONSECA, Filho (Olympio) & LEO (A. E. de Arêa). [In Portuguese and English.] Contribuição para o conhecimento da *Hemispora stellata*. **A Contribution to the Knowledge of *Hemispora stellata*.**—*Sciencia Med.* 1927. Oct. Vol. 5. No. 10. In Portuguese pp. 585-587. With 2 text figs. & 2 figs. on 1 plate. In English pp. 587-588.

— & —. Contribution à l'étude d'*Hemispora stellata*.—*C. R. Soc. Biol.* 1927. Vol. 97. No. 36. pp. 1790-1792. With 2 text figs. [Oswaldo Cruz Inst., Rio de Janeiro.]

Cultures of a fungus isolated at São Paulo by Dr. J. MACIEL were identified as cultures of *Hemispora stellata*. The lesions from which the cultures were obtained appeared on the arm as suppurating subcutaneous nodules, arranged in lines which seemed to follow the course of the lymphatics. Thus, the lesions resembled those of sporotrichosis.

P. Tate.

ALLISON (J. Richard). **Fungus Disease of the Skin.**—*Southern Med. Jl.* 1927. Aug. Vol. 20. No. 8. pp. 604–606.

This is a short general paper on the clinical aspect of mycoses of the glabrous skin. The application of treatment for mycoses on a clinical diagnosis is advocated; and the importance of the differential diagnosis of epidermophytosis from occupational dermatoses is emphasized.

P. Tate.

KIRBY-SMITH (J. L.). **Trichophytosis, a Dermatological Problem in the Southern States.**—*Southern Med. Jl.* 1927. Aug. Vol. 20. No. 8. pp. 606–610. With 6 text figs.

The author found that in his practice the percentage of cases of dermatoses due to fungi was about 33·3 per cent. for ten months and increased to 45 per cent. for the three rainy months. Of the 480 cases seen, only 6 were of tinea tonsurans, all the rest involving the glabrous skin. The importance of hygienic measures in connexion with the treatment of dermatomycoses is emphasized.

P. Tate.

ACTON (Hugh W.) & PANJA (Ganapati). **Seborrhoeic Dermatitis or Pityriasis Capitis: a Lesion caused by the *Malassezia ovale*.**—*Indian Med. Gaz.* 1927. Nov. Vol. 62. No. 11. pp. 603–614. With 30 figs. on 8 plates and 4 coloured figs. on 2 plates. [7 refs.]

The main interest of this communication lies in the account of the mycological features of the *Malassezia* organism and of its cultivation. The pilo-sebaceous and sebaceous glands are described and a general account is given of the seborrhoeic affections due to invasion of the epidermis and hair follicles by the fungus. The relation of this infection to other conditions is discussed, including eczema rubra of infants, dermatitis with lichenification of the large flexures occurring in older subjects, acne keloid and the Fox-Fordyce syndrome. It is stated that "we consider that most of the so-called eczemas seen in the very young and old are primarily due to seborrhoea." [No positive evidence is put forward to support this hypothesis.] Concerning the mycology, the fungus appears in the scales as flask shaped bodies, round swollen forms, smaller coccal elements and irregular shaped mycelia. Cultures were obtained on Petroff's glycerinated medium with the addition of 0·004 per cent. gentian violet. On this medium the primary cultures appear as small dry chalky white colonies visible to the naked eye about the third day. The usually accepted treatment is described in detail, the writers wisely emphasizing the primary seat of the trouble in the scalp which requires constant attention.

W. J. O.

DELAMARE (G.) & GATTI (C.). Sur la piedra du Paraguay. [**The Piedra of Paraguay.**]—*Bull. Acad. Méd.* 1928. May 8. Year 92. 3rd Ser. Vol. 99. No. 19. pp. 500–503. [1 ref.] [Med. Clinic of the Faculty of Asuncion, Paraguay.]

A short account of the disease, as observed in Paraguay, notes its comparatively exceptional occurrence in women. Bathing together

with sebaceous and sweat secretion would seem to be contributing factors to the development of the affection. The nodules appear exclusively on the long hairs, about the top of the head and not on the nuchal region. Their number varies from 2 to 5 per hair and they occur as cylindrical or ovoid dark hard masses on the hair shafts, which are otherwise normal. Microscopical examination of the nodule shows a mosaic mass of refractive cellules, branching mycelium cysts of Horta containing flagellate elements and a ground substance showing black granules. The cultural characteristics of the fungus are briefly described. The *Trichosporum* in question would seem to be more closely allied to *T. Hortai* than to *T. giganteum*, while clinically the condition resembles that seen in Brazil more than that of Columbia.

W. J. O.

MITCHELL (James Herbert). **Need for Research in the Treatment of Epidermophytoses.**—*Jl. Amer. Med. Assoc.* 1927. Aug. 6. Vol. 89. No. 6. pp. 421-423. [31 refs.]

The author discusses in a general manner the therapeutics of dermatomycoses of the glabrous skin; and utters a warning against over-treatment, which may result in turning a mild ringworm into a chronic dermatitis. Recent methods of treatment mentioned are:—Iodine and ammoniated mercury advocated by HAUCK and found to be very effective by SACHS (*Dermat. Wochenschr.* 78. 165. 1924). WHITE (*Arch. Dermat. & Syph.* 15. 400. 1927) considers that a 2 per cent. solution of mercurochrome-220 soluble to be the most effective drug. FONTYNONT & BOUCHER (*Arch. Dermat. & Syph.* 4. 209. 1923) found that a serious infection of *Cryptococcus mena*, yielded to 0.1 gm. of methylene blue taken internally daily, and the application of a 1 per cent. solution of the same drug externally; and they also found that RAVAUT's treatment (*Ann. de Dermat. et Syph.*, May, 1921) of intravenous injection of diluted compound solution of iodine was the best for infection with *Sporotrichum beurmanni*. The author finds MYERS and THEINES' (*Jl. Amer. Med. Assoc.*, 84, 1985-1986, 1925) alcoholic solution of cinnamon oil and thymol to be more effective than Whitfield's ointment.

P. Tate.

MURATA (T.); MURATA (T.), ITOH (T.) & OGAWA (K.). Ueber eine spezifische Hautkrankheit im Sarikotokagebiet in der Ostmongolei. I. Mitteilung: Klinischer Teil. [MURATA.] **A Specific Skin Disease in East Mongolia.**—*Jl. Oriental Med.* 1928. Apr. Vol. 8. No. 4. German summary p. 63. [In Japanese.] II. Mitteilung: Pathologischer Teil [MURATA, ITOH & OGAWA.]—*Ibid.* German summary p. 64. [In Japanese.] [Manchuria Med. College, Mukden.]

I. Concerns a skin affection occurring among peasants working in the damp rice fields of Sarikotoka. The condition appears as a skin rash showing marked redness and itching on the hands and legs, which eruption appears to be an independent skin affection unaccompanied by any general or prodromal symptoms and clears up as a rule in the course of 2-3 weeks after cessation of work, though it may pass over to a chronic eczema.

II. Microscopical examination of a papular lesion showed only slight degeneration of the epidermis, perivascular infiltration in the subcutis and subcutaneous fat region consisting mainly of small round cells with some polynuclear (chiefly eosinophile) leucocytes, fibroblasts and large mononuclear cells, slight degeneration of the sweat glands; no alteration in the hair papillae, hair follicles or sebaceous glands. No parasites were discovered which could have any direct relationship to the skin disease. While all other investigations gave negative results, it is hoped that these investigations, together with the observation of the onset of the affection at the beginning of the rice sowing season, may lead in the future to the explanation of the disease.

W. J. O.

DI LULLO (Orestes). El páaj. [**Páaj**].—*Bol. Inst. Clin. Quirúrg.* Buenos Aires. 1927. Vol. 3. Nos. 21-25. pp. 125-136. With 2 text figs. [Also issued as *3a Reunión, Soc. Argentina Patol. Regional del Norte, Tucumán, Julio 7, 8 y 10, 1927.* pp. 17-28 & illustrations.]

"Páaj" is the Peruvian name of an eruptive disease set up by the plant *Schinopsis lorenzii* (*Anacardiaceae*). It is a regional affection occurring commonly in Santiago and the Northern districts. Another name for the disease and for the plant causing it is "quebracho." The condition is accompanied by intense itching, redness, oedema, a papular eruption and, at times, swelling and tenderness of the related lymph-glands. The whole body-surface, face, trunk and limbs, may be involved. The patient scratches himself violently, being almost frenzied by the irritation, especially at night. Furfuraceous desquamation ensues. The seasonal prevalence is that of the flowering of the plant, February to April; contact with any part of it, the leaves, flowers, branches or trunk, will cause the rash, as may apparently also the pollen, since a history of actual contact is not always elicited.

H. Harold Scott.

POLAK (H. J.). **Flit-dermatitis**.—*Geneesk. Tijdschr. v. Nederl.-Indië*. 1928. Vol. 68. No. 2. pp. 297-298.

Proprietary products are introduced on the market as vermin killers under various names (Flit, Rids, Shelltox). They probably chiefly consist of kerosene, some also containing carbon tetrachloride or methyl salicylate. The author saw four cases of itching dermatitis, following the application of Flit. In these cases the patients had moistened their legs with the stuff in order to keep mosquitoes away instead of using the spray following the instructions.

W. J. Bais.

WEHRLE (W. O.). Eine besonders resistente Art des Ulcus tropicum. [**A Very Resistant Form of Tropical Ulcer**].—*Arch. f. Schiffs- u. Trop.-Hyg.* 1928. June. Vol. 32. No. 6. pp. 324-325.

A brief account from Liberia of tropical ulcers occurring on the toes and showing a remarkable resistance to treatment. In every case numerous spirochaetes and fusiform bacilli were found. The cases all concerned children and arose through injury to the toes, usually the great toe, from striking against rocks. A sore would appear

on the point of the toe or about the edge of the nail, which became destroyed, and spread to the deeper tissues to invade the bone. With its preserved under surface and swollen oedematous edges the affected toe would have the appearance of being "scooped out," frequently with the necrotic terminal phalanx thrusting itself out from the sore. No evidence of yaws could be determined, and the administration of iodides and neosalvarsan proved ineffective. While healing with the loss of the first phalanx might occur after many months' treatment with local applications the extreme pain usually induced the patients to seek amputation of the affected digit, which treatment is recommended especially in the case of the smaller toes.

An interesting case is mentioned of an older patient whose finger became infected from a large ulcer on the leg. The finger lesion healed rapidly after removal of the nail, the application of sublimate compresses and desitin. On account of its clean and innocuous nature this last mentioned medicament is lauded by the author who has obtained very satisfactory results from its use in other cases of tropical ulcer.

W. J. O.

GELONESI (G.). *L'ulcus tropicum della Somalia.* [**Ulcus tropicum in Somalia.**—*Ann. di Med. Nav. e Colon.* 1927. Sept.-Oct. Year 33. Vol. 2. No. 3-4. pp. 140-164. With 6 text figs. [29 refs.] [Clinic, Villaggio Duca d'Abruzzi, Somali & School of Marine Hyg., Naples.]

The author is of the opinion that *ulcus tropicum* is not a specific form of spirochaetosis but is caused by a fusiform bacillus associated with three types of spirochaetes, and of these the bacillus is the chief pathogenic agent. The three spirochaetes he denominates *Sp. monospirale*, *Sp.* with large coils, and a *treponema* with close spirals. In the deeper parts of the ulcer the spirochaetes become fewer while the bacilli remain. A mixed clinical classification is presented, according to depth of ulcer of three types: 1. Superficial or cutaneous; 2. Deeper, subcutaneous or muscular; 3. Deep or bony; and according to character three more: 4. Efflorescent; 5. Fungous; 6. *Ulcus sarcomatodes*.

He holds that it is vain to rely upon arsenical preparations as specific for this disease. Each case needs to be treated according to the stage and character of the lesion. For the first two, irrigation and the application of antiseptics are advised, and, if the *B. fusiformis* persists, 3-5 per cent. solution of methylene blue; for the third, scraping followed by antiseptics; for the fourth nitrate of silver; for the fifth Paquelin's cautery is useful. Surgical intervention is needed for the last and in this form arsenicals are particularly contraindicated as favouring hyperplastic processes.

H. Harold Scott.

HAMILTON (George R.). **Larva Migrans in Australia.** With a Note by the late E. W. FERGUSON.—*Med. Jl. Australia.* 1927. Dec. 24. 14th Year. Vol. 2. No. 26. pp. 875-878. With 3 text figs.

A typical case of creeping eruption on both feet of a child who for some days beforehand had been going barefoot. Both lesions at the beginning

were thought to be fleabites, and were intensely irritable. A measurement of the longer and more sinuous track showed a course of 19.5 cm. in a term of 33 days. The skin involved in both lesions was widely and carefully excised and was examined microscopically either by dissection or in serial sections, but no trace of a foreign body of any kind was discovered.

The note appended to the report is a review of the various organisms—maggots of bot-flies, larvae of nematode worms, and mites—not to mention inanimate objects, which have been reported as causing creeping eruption of the skin in man.

A. Alcock.

WHITE (G. F.) & DOVE (W. E.). **The Causation of Creeping Eruption.**
—*Jl. Amer. Med. Assoc.* 1928. May 26. Vol. 90. No. 21.
pp. 1701-1704. With 7 text figs. [10 refs.]

"Creeping eruption" of the skin, once supposed to be caused solely by the migrations of Oestrid-fly larvae, is now known to be due to several other kinds of parasites, and in the present paper the third-stage larva of *Ancylostoma braziliense*, a hookworm of dog and cat, is shown to be one of them. Third-stage nematode larvae of some sort having been recovered by serial sectioning from 5 out of 48 excised "creeping" lesions, investigations for the adult form of those larvae led, after several unsuccessful experiments in other directions, to trial of larvae from faeces of dog and cat in places where creeping eruption was frequent. When these larvae were applied to the human skin creeping eruptions followed. Post mortem examinations of the dogs and cats revealed the fact that the adult forms were *A. braziliense* and *A. caninum*, of which only the former produced the characteristic lesions.

A. Alcock.

PHOTINOS (Théodore). Presentation de deux moulages de "Creeping Disease." [**Exhibition of Two Wax Models of Creeping Disease.**]
—*Bull. Soc. Française Dermat. et Syph.* 1928. Jan. No. 1.
pp. 37-40. With 2 text figs.

The two moulages presented to the museum of the Saint-Louis Hospital portrayed the second case of creeping disease that has been observed in Greece. The lesions consisted of multiple well-defined filiform erythematous lines distributed over the whole abdominal wall and extending on to the thorax in front, over the left lower half of the back as far as the spinal furrow and on the right side below the scapula. They occurred most densely about the umbilicus where there was a fistula in association with an old tuberculous peritonitis. The centrifugal spread of the lesions from this area to form a network of lines and gyrate-shaped figures suggested a probable infection of multiple parasites from the alimentary tract. Unfortunately no parasites had been found, but the donor considered these to have been the larvae of *Gastrophilus*, basing his supposition on the clinical appearance of the distinct non-inflammatory lesions which showed no secondary infection.

W. J. O.

TODD (M. L.). **Larva Migrans.**—*Milit. Surgeon.* 1928. May. Vol. 62. No. 5. p. 642.

Note of a case occurring on the thigh after "chiggers." [No mention is made of the duration of the condition, the clinical appearance of the lesion or of any attempt to define the parasite.] "The skin was frozen with ethyl chloride, the burrow split at the advancing end with a fine galvano cautery point and the floor of the burrow cauterised. The reaction was slight and the cure instantaneous."

W. J. O.

ACTON (Hugh W.). **Ainhum, a Band Scleroderma.**—*Indian Jl. Med. Res.* 1928. Apr. Vol. 15. No. 4. pp. 1085-1090. With 2 plates (1 coloured). [26 refs.]

This communication is presented in a rather unconvincing style. The lesion of ainhum is defined as "a band scleroderma causing rarefying osteitis of the phalanges." Its occurrence as a familial affection is noted and its frequent association with symmetrical palmar and plantar hyperkeratosis. A condition of hypothyroidism is suggested. In three cases the blood calcium had been found to be a great deal lower than normal, pointing to a diminution of parathyroid function. In the early stages of the disease rest in bed and the administration of large doses of thyroid (gr. ii t.d.s.) with extract parathyroid (1/20 gr.) and calcium lactate (gr. x) b.d. is sufficient to bring about an amelioration of the symptoms. In the later stages division of the constricting band may be combined with the above mentioned medicinal treatment.

W. J. O.

SINNATAMBY (G. S.). **Notes on Three Cases, Rare, both from a Tropical and Clinical Point of View.**—*Jl. Ceylon Branch Brit. Med. Assoc.* 1927. Oct. Vol. 24. No. 2 pp. 162-164. With 2 figs. on 2 plates.

This communication contains a report of two cases of ainhum from Ceylon of 11 and 13 years' duration respectively. In the second case both feet were affected but in a different degree

W. J. O.

ACTON (Hugh W.). **Porokeratosis: its Causation and Treatment.**—*Indian Jl. Med. Res.* 1927. Oct. Vol. 15. No. 2. pp. 349-353. With 3 plates (2 coloured). [5 refs.] [School of Trop. Med., Calcutta.]

Eight cases are very briefly mentioned, two of these concerning brothers. The condition is considered to be a type of ichthyosis associated in some indirect way with hypofunction of the thyroid gland. Complete cure is claimed in 2-3 weeks' time by proper thyroid medication, the dosage being determined by the estimation of the basal metabolism.

W. J. O.

ROBLÈS (Rodolphe). La pseudo-lèpre ou "punudos," maladie non classée qui sévit au Guatemala. [**Pseudo-Leprosy or Punudos, an Unclassed Disease of Guatemala.**].—*Bull. Acad. Méd.* 1927. June 7. Year 91. 3rd Ser. Vol. 97. No. 23. pp. 776-780. With 3 text figs.

A short account of an incurable elephantiasic condition of the feet occurring equally in both sexes and apparently peculiar to certain villages of Guatemala. Commencing usually in childhood, about the sixth or seventh year, the disease first shows itself as an erythematous lesion about the instep of one foot, accompanied by inguinal adenitis of the corresponding side and associated with raised temperature and general malaise. The foot is slightly painful while itching is usually absent. The skin lesion and general symptoms persist for 3-6 days leaving some slight oedema of the affected foot and ankle. After an interval of some six months another similar attack occurs, to be repeated at shorter intervals and to leave increased swelling of the foot after each attack. The toes gradually develop papillomatous swellings on the dorsal surfaces, the larger growths being always towards the free end of the digits. The soft parts are alone affected, no change being observed in the bones on X-ray examination. The other foot gradually becomes involved and the condition persists throughout life. Heredity appears to play no part in the affection, contagion if any is only slight, while the disease is strictly confined to regions of a temperate climate. Although the localization of the disease suggests an infection contracted by going barefooted no parasites or bacilli have been found locally or in the blood.

W. J. O.

DA ROCHA LIMA (H.). Ueber verrugaähnliche Erkrankungen (Pseudo-verrugas). [**Verruga-like Diseases (Pseudoverrugas).**].—*Abhandl. a. d. Gebiet d. Auslandskunde. Hamburg. Univ.* 1927. Vol. 26. (D., Med. & Vet. Vol. 2.) [Festschrift NOCHT.] pp. 464-466. With 2 figs. on 1 plate. [7 refs.] [Inst. for Ship & Trop. Diseases, Hamburg.]

A study of verruga-like nodules occurring outside the endemic area of true verruga showed that the so-called botriomycosis, or teleangiectatic granulomata, of the skin, described by BASSEWITZ in S. Brazil, was probably an infectious and local affection of the skin, known as *Angiofibroma cutis contagiosum*.

Nevertheless, the occurrence of multiple tumours on different portions of the body betokens a universal infection and close relationship to the verruga exanthem. There is therefore a skin disease which in its clinical, macroscopic and microscopic features cannot be differentiated from true verruga.

The condition has been well-named by Alfredo DA MATTA "pseudo-verruga." From a village on the upper Amazon a patient was studied who exhibited multiple tumours on different parts of his body. Individual lesions were well supplied with blood and much resembled those of yaws. With the exception of headaches, digestive disturbances and slight fever, there were no signs of illness.

The microscopic structure on section much resembled in the nature and arrangement of the cells that of true verruga, but the cell-inclusions which the author originally described in verruga, cannot be made out in this tissue.

P. H. Manson-Bahr.

KÄYSER (J. D.). On Some Tropical Impetigos.—*Acta Leidensia (Scholae Med. Tropicae)*. 1927. Vol. 2. pp. 111–119. [10 refs.]

This short communication gives a brief account, which does not call for any comment, of some forms of impetigo lesions observed in the tropics. Attention is drawn to the epidemic infectious nature of pemphigus contagiosus which would seem to be the same condition as impetigo bullosa observed at home. Of real value is the recommendation to avoid the application of ointments in favour of a non-irritating antiseptic lotion such as sol. sublimate 1:1000, or sublimate 0.5, ammon. chlor. 1, spirit 100, water 250 parts, to be followed when the skin is dry by a mild antiseptic dusting powder.

W. J. O.

NOEL (P.). Psoriasis chez un Noir. [**Psoriasis in a Black Man.**]—*Ann. Dermat. et Syph.* 1928. Jan. No.1. pp. 37–42. [17 refs.]

Report of a case observed at Pondicherry, of a male aged 58 years in whom the first lesion of psoriasis had been noticed on the left leg one year before his coming under observation. There was no family history of any similar trouble; he suffered from asthma in the rainy season. Some of the lesions showed no apparent change of colour while others were of a deeper brown tint than the healthy skin. The lesions of the nummular and gyrate-shaped variety occurred in marked symmetrical distribution on the limbs, lower half of the trunk, on the scalp and ears. He complained of no pruritus and no joint troubles. The extreme rarity of the occurrence of the disease in the black races is discussed with numerous references to the literature.

W. J. O.

RAMOS E SILVA (J.). Algumas observações sobre a therapia aurica do lupus erythematosus e da lepra. [**Gold Treatment of Lupus Erythematosus and of Leprosy.**]—*Brasil-Medico*. 1928. May 19. Vol. 42. No. 20. pp. 538–540. [11 refs.]

Brief notes are given of four cases of lupus erythematosus and one of leprosy of the maculo-anaesthetic type treated by gold preparations. Of the former one patient was cured, and two improved; the fourth and the case of leprosy received no benefit.

The first was a man of 27 years with lupus erythematosus of the nose. He was given krysolgan (supragol), an amino-auro-thiophenol, at first in a dose containing 0.0001 gm. After twelve injections with increasing amounts [not stated, nor the length of the intervals] a cure appeared to be complete and only a little pigmentation remained. In all he was given 17 cgm. The second was a woman of 30 years with a similar condition. She was given 0.0005 gm. of triphal, a sodium compound of auro-thio-benzimidazol, containing about 44 per cent. of gold. At the seventh injection a dose of 0.032 gm. was reached, but this was badly tolerated and 0.025 gm. was used for the remainder of the course. Thirteen injections were given and a total of 28 cgm. Cicatrization occurred with considerable improvement. The third was given krysolgan for six injections, and then triphal, but the latter gave rise to a sensation of "pins and needles" over the whole body, so the former was reverted to. Fifteen injections were given, a total of 13 cgm. Improvement was but slight. The other cases, as already mentioned, did not reap any benefit.

H. Harold Scott.

CASAZZA (Roberto). Sui dermatozoi, a proposito di un nuovo parassita. (Creeping Disease e Pseudo-scabbia da "*Dermolecanium migrans*."). [**Pseudo-Scabies. Infection by a New Parasite, *Dermolecanium migrans*.**]—*Bol. d. Soc. Med.-Chirurg. di Pavia*. 1928. Year 42. Vol. 6. No. 3. 37 pp. With 10 figs. on 2 plates. [7 refs.] [Dermosyph. Clinic, Univ., Pavia.]

A general survey of parasitic infections of the skin with a more detailed account of two cases in which the parasites are said to have been larvae of a scale-insect (Coccidae) differing from all known species. Figures of the insect are added. A. Alcock.

DA MATTA (Alfredo). Epidermophytoses e seu tratamento.—*Brasil-Médico*. 1927. Dec. 31. Vol. 41. No. 53. pp. 1,394-1,396.

RABIES: A REVIEW OF RECENT ARTICLES. IX.*

The reports by MARIE, REMLINGER and VALLÉE which formed the basis of discussion at the first International Rabies Conference, after having been revised and in large part rewritten in the light of the discussions which took place at the various meetings, have now been published in book form by the Health Section of the League of Nations,¹ and also as a supplementary number to the *Annales de l'Institut Pasteur*, Paris,^{2, 3, 4, 5, 6}. The titles of the various chapters are given below. Each chapter forms an admirable critical review of present knowledge regarding the subject under consideration. The distinguished rapporteurs are to be congratulated upon the results of their labours. Their reports form a valuable addition to the literature of rabies, and should be in the hands of all who are interested in the subject. They are written with the philosophic clarity of exposition which is characteristic of the French school. Naturally errors have crept in, as was to be expected in the verbatim reporting of so much evidence. For example, in discussing SEMPLE's method of treatment of carbolized vaccines, MARIE gives the following table, as summarizing "the principal results obtained with this method of treatment":—

	Annual Average num- ber of persons treated.	" Mortality percentage." (Marie).	Percentage of total deaths.
Bombay	2,875	2.12-0.11	1.17
Calcutta	About 5,000	4.7-0.5	not submitted
Shanghai	130	7.7-1.2	0.90
Coonoor (British India)	3,131	1.075-0.75	0.98
Jerusalem	858	2.5-0.60	0.64
Kasauli	4,030 (corrected 6,060)	1.76	1.16
Lwow	1,338	0.059	0
Rangoon	466	0.22	0.60
Rome	496	0.16	0.16
Shillong	1,503	0.41	0.95

¹ MARIE (A. C.), REMLINGER (P.) & VALLÉE (H.). Reports to the International Rabies Conference (1927). Publications of the League of Nations. (C.31, M.16, 1928, III) (C.H. 531(1). English version League of Nations, Publication Department, Geneva. pp. 1-164.

² MARIE (A. C.) Sur la nature du virus rabique.—*Ann. Inst. Pasteur*. (Supplément Conférence Internat. de la Rage [Paris, 25-29 Avril 1927]) pp. 12-35. [44 refs.]

³ MARIE (A. C.). Technique de la vaccination de l'homme après morsure. Modifications diverses apportées au traitement pastorien.—*Ann. Inst. Pasteur*. (Supplément Conférence Internat. de la Rage [Paris, 25-29 Avril 1927]) pp. 36-70. [46 refs.]

⁴ REMLINGER (P.). Les paralysies du traitement antirabique.—*Ann. Inst. Pasteur* (Supplément. Conférence Internat. de la Rage [Paris, 25-29 Avril 1927]) pp. 71-132. [103 refs.]

⁵ REMLINGER (P.). Les accidents locaux du traitement antirabique.—*Ann. Inst. Pasteur*. (Supplément. Conférence Internat. de la Rage [Paris, 25-29 Avril 1927]) pp. 133-143

⁶ VALLÉE (H.). La vaccination antirabique chez les animaux.—*Ann. Inst. Pasteur*. (Supplément. Conférence Internat. de la Rage [Paris, 25-29 Avril 1927]) pp. 144-165. [29 refs.]

* For the eighth of this series see Vol. 25, pp. 187-199.

As some of the figures of "percentage mortality" are startling, and would convey the impression that the mortality with this method was unduly high, I have gone back to the original answers to the questionnaire submitted from the various institutes and circulated to members of the Conference. It appears that MARIE has tabulated, under "percentage mortality," figures relating to particular groups of cases (e.g., the figure 7.7 per cent. relating to Shanghai is the percentage mortality in a particular Group (C2) of thirteen cases, one of which developed rabies) and not to the whole. I find that the true values are as indicated in the final column. These are in agreement with those given by PRAUSNITZ, and tabulated in my last review.

It should also be noted that in the two tables relating to frequency of accidents of treatment (REMLINGER, pp. 83 and 95 of the English version published by the League of Nations, and the corresponding tables in 4) the figures described as "percentages," are in reality rates per mille.

This series of critical reviews by the rapporteurs of the various commissions, taken in conjunction with that of PRAUSNITZ (one of the co-rapporteurs of the combined commission on Methods and Accidents of Treatment), forms an excellent resumé of current views regarding the problems of rabies.

i. *Virus*. I have on frequent occasions referred to investigations which appear to show that in certain cases continued subpassage of fixed virus results in a loss of virulence, especially with regard to inoculation into the anterior chamber of the eye. Thus REMLINGER and BAILLY claim that the Tangier strain (this *Bulletin*, Vol. 24, p. 761) shows a marked mutation in its 2360th passage, PUNTONI reports a similar variation in the Rome strain. On the other hand LE FEVRE DE ARRIC and TCHANG KOUO-NGEN (this *Bulletin*, Vol. 21, p. 710), state that the Brussels strain (ex. Paris) has if anything increased in virulence. BURNET (*loc. cit.*, Vol. 22, p. 700) using the Tunis strain, BABLET (Vol. 23, p. 198) using the Saigon strain, MARIE (Vol. 23, p. 693, Vol. 24, p. 222, and Vol. 24, p. 761), using the Paris strain, PALAVANDOFF and WEINBERG (Vol. 24, p. 222), using the Odessa strain, ISABOLINSKY and ZEITLINA (Vol. 24, p. 222), using the Smolensk strain, ROCHAIX (Vol. 24, p. 761) using the Lyons strain have found no evidence of reduction of virulence. PLANTUREUX (Vol. 22, p. 700; 23, p. 693, and 24, p. 222) claimed that though the Algiers strain has lost virulence with regard to desiccation and to the action of glycerine, it had remained unaltered as regards intracorneal inoculation. PLANTUREUX⁷ has carried out a further series of experiments on the intracorneal virulence of the Algiers virus, and now claims that a definite reduction has taken place.

In a series of three papers MANOUÉLIAN and VIALA^{8, 9, 10} shed

⁷ PLANTUREUX (E.). Modification du pouvoir pathogène du virus rabique fixe d'Alger, pour la chambre antérieure de l'oeil.—*C. R. Soc. Biol.* 1928. Apr. 17. Vol. 98. No. 12. pp. 935-936. [2 refs.] [Pasteur Inst., Algiers.]

⁸ MANOUÉLIAN (Y.) & VIALA (J.). Cellules nerveuses et virulence des glandes salivaires.—*C. R. Acad. Sci.* 1927. Dec. 27. Vol. 185. No. 26. pp. 1623-1625.

⁹ MANOUÉLIAN (Y.) & VIALA (J.). Cellules nerveuses et virulence des glandes surrénales.—*C. R. Acad. Sci.* 1928. Jan. 30. Vol. 186. No. 5. pp. 327-329.

¹⁰ MANOUÉLIAN (Y.) & VIALA (J.). Lésions des parois de la bouche et de la langue chez les chiens enragés.—*C. R. Acad. Sci.* 1928. Apr. 30. Vol. 186. No. 18. pp. 1242-1243.

light upon the irregularities which are found in the virulence of salivary and other secretions. It is well known that in the parotid, sub-maxillary, sublingual, and buccal glands, neurones may be demonstrated either as single cells, or in ganglionic aggregations. These lie just under the epithelium. The cytoplasm of these neurones may contain the rabies parasite. The virulence of the gland depends upon the presence of the neurones, and the virulence of the saliva depends upon abrasions of epithelium exposing the infected neurones. The irregularity of inoculation results depends upon the presence or absence of virulent nervous material in the fragments inoculated. As the nervous material is unequally distributed, certain portions of a gland may be infective whilst others are not infective. The authors describe similar distributions of neurones in the suprarenal gland, and confirm da Costa's claim that Negri bodies may be present in the gland, but add the limitation that they only occur in the scattered neurones. They have also examined the nature of the abrasions which occur in the overlying epithelium in the buccal mucosa. These observations shed light upon the way in which the rabies virus reaches the saliva—a question which, formerly, was puzzling.

REMLINGER¹¹ starting from the observation that it is extremely difficult to infect by rubbing in to the abraded skin a thick emulsion of brain containing street virus, and contrasting this observation with the fact that the saliva when inoculated under natural conditions is frequently found to be infective even in very minute doses, inclines to the view that the germ exists in the saliva in a different form to that in which it is present in the brain. This hypothesis is in agreement with LEVADITI's view that the virus in the brain is a pansporoblast, whilst in the saliva it is in filtrable form.

ABADJIEFF¹² finds that rabies virus is rendered avirulent by exposure to the action of a 5 per cent. solution of Yatren (in the form of a sodium salt) for three hours at 37° C.

TAKAYA¹³ claims that whilst both fixed and street virus are reduced in virulence by the action of ultra violet rays, the effect is greater on the latter than on the former. The immunizing properties of antirabic serum are also reduced by similar exposure.

REMLINGER and BAILLY¹⁴ have failed to find any trace of local immunization (in the Besredka sense) in the case of rabies. Two experiments were carried out on nine and ten rabbits respectively. The vaccinal dose (dried cord emulsion) was introduced into one cerebral hemisphere, and the surviving animals after this treatment were tested for immunity by the administration of more active doses into the other hemisphere. All developed rabies with the same

¹¹ REMLINGER (P.). Sur la différence d'agressivité du virus rabique dans la bave et la substance nerveuse — *C.R. Soc. Biol.* 1928. Feb. 17. Vol. 98. No. 6. pp. 437-439.

¹² ABADJIEFF (Boris). Ueber die Beeinflussung des Lyssavirus durch Yatren-Natrium. — *Cent. f. Bakt. I. Abt. Orig.* 1928. May 14. Vol. 107. No. 4-5 pp. 202-205. ["Robert Koch" Inst., Berlin.]

¹³ TAKAYA (J.). The Influence of the Ultra-Violet Ray on the Immune-Body of Rabies — *Oriental Jl. Dis. Infants.* 1928. Jan. Vol. 3. No. 1. English summary p. 17. [In Japanese.] [Children's Clinic, Imperial Univ., Kyoto.]

¹⁴ REMLINGER (P.) & BAILLY (J.). Echec de la vaccination locale cérébrale dans la rage. — *C.R. Soc. Biol.* 1928. Apr. 27. Vol. 98. No. 13. pp. 1117-1119 [2 refs.] [Pasteur Inst. of Morocco, Tangiers.]

incubation periods as untreated controls. A further experiment using ether vaccine gave similar negative results.

On the other hand MARIE and MUTERMILCH¹⁵ claim to have obtained local immunity by vaccination both by the subdural and by the intra-ocular routes. As the test employed was a subdural injection of fixed virus, the immunity which they claim to have established would have to be of a very high order. The brains of animals which succumbed showed either diminution or absence of virulence. They also found that the aqueous humour of animals vaccinated intra-ocularly, as well as the cerebro-spinal fluid of those vaccinated subdurally, contained antibodies. The argument is brought forward that the local immunities developed would appear to depend upon secretions from the ciliary body, or the choroid plexus as the case might be. The authors admit that their immunization results were somewhat inconstant.

ii. *Clinical*. GREEN¹⁶ reports a case of rabies from Central Kavirondo in which paralysis of both legs was a prominent symptom, and GLUSMANN¹⁷ describes a peculiar instance, in which the patient—a doctor—had been an invalid and under close observation over a period of three years. He was bedridden and suffered from progressive ankylosis of the spine. There was no history of contact with any animal likely to convey infection. He died under conditions which suggested a diagnosis of rabies. The diagnosis was confirmed by animal experiment.

iii. *Pathology*. NICOLAU and MATEIESCO¹⁸ as a result of experiments on rabbits in which, after section of the sciatic nerve, a dose of street virus was administered subdurally, found that the distal portion of the sciatic nerve remained avirulent, thus confirming BABES' original experiments, and showing that the centrifugal dissemination of the virus is confined to the nerve paths.

TCHCHKOW¹⁹ presents further evidence in favour of the view that the virus is diffused through the central nervous system by the cerebro-spinal fluid. The communication of PONOMAREW and TCHCHKOW²⁰ which I summarized in my previous report (*ante* p. 191), appears again in another journal.

¹⁵ MARIE (A. C.) & MUTERMILCH (S.). Nouveaux essais de vaccination contre la rage.—*C.R. Soc. Biol.* 1928. May 18. Vol. 98. No. 15. pp. 1314-1315. [2 refs.] [Pasteur Inst., Paris.]

¹⁶ GREEN (F. N.) A Case of Hydrophobia in Central Kavirondo.—*Kenya & East African Med. J.* 1928. Feb. Vol. 4. No. 11. pp. 353-354.

¹⁷ GLUSMANN (M.). Ein seltener Fall von Tollwut.—*Ztschr. f. Hyg. u. Infektionskr.* 1928. Apr. 30. Vol. 108. No. 3. pp. 588-593. [Charkow Bact. Inst., & "Robert Koch" Inst., Berlin.]

¹⁸ NICOLAU (S.) & MATEIESCO (E.). Septinévrites à virus rabique des rues. Preuves de la marche centrifuge du virus dans les nerfs périphériques des lapins.—*C.R. Acad. Sci.* 1928. Apr. 16. Vol. 186. No. 16. pp. 1072-1074. [5 refs.]

¹⁹ TCHCHKOW (A. M.). Du rôle du liquide céphalorachidien dans le mécanisme du développement de la rage.—*Arch. Sci. Biol.* 1927. Vol. 27. No. 4-5. French summary pp. 398-399. [In Russian pp. 307-322. With 5 figs.] [Inst. of Exper. Med., Leningrad.]

²⁰ PONOMAREW (A. W.) & TCHCHKOW (A. M.). Sur quelques conditions de l'action du sérum antirabique dans l'organisme.—*Arch. Sci. Biol.* 1927. Vol. 27. No. 4-5. French summary p. 399. [In Russian pp. 323-336 11 refs.] [Inst. of Exper. Med., Leningrad.]

TAKAYA²¹⁻²² reports observations on the blood picture after intramuscular and intraspinal infection by fixed virus, and finds that with the Arneth method there is a deviation to the left.

JONNESCO²³ inoculated five rabbits with the urine of a patient who died of rabies, and succeeded in infecting two of these, thus confirming BOUCHARD's observations.

iv. *Diagnosis.* According to GALLI-VALERIO²⁴ the symptoms of rabies may be simulated by affections due to various animal and vegetable parasites. Cases are cited in which a variety of these were incriminated. The author suggests that if parasites are found on post mortem examination, in the absence of Negri bodies, a negative diagnosis may in certain instances be immediately arrived at, thus avoiding the delay which an animal test necessitates.

Using cooked antigens and glycerine extracts as recommended by KRAUS and MICHALKA (this *Bulletin*, Vol. 24, p. 224) GLUSMANN and SOLOWJOWA²⁵ have been unable to demonstrate a specific deviation of complement. Antigens prepared from normal and infected brains react equally. IMIG²⁶ using the same antigens, was unable to demonstrate a difference in deviation, using on the one hand the sera of rabbits treated with fixed virus, and on the other those of rabbits treated with normal brain substance. The same negative results were observed in the case of Borna's disease.

v. *Methods of Treatment.* REMLINGER²⁷ suggests as a standard method of treatment the use on the earlier days of treatment of cords which have been kept in glycerine in the ice-chest for 25-30 days, and in the later of cords which have been kept for shorter periods. The reason for this procedure depends upon the observation that whilst the Tangier strain of fixed virus maintains its virulence up to 24-25 days, and then shows a brusque decline, its vaccinal power remains. Thus even after being kept for more than 25 days it is able to confer a solid immunity, though it cannot convey infection. The method which REMLINGER describes has been in use in Smolensk

²¹ TAKAYA (J.). Experimental Studies of Rabies (Fourth Report). The Influence of Fixed Poison upon the Blood-Finding when injected Intraspinally.—*Oriental Jl. Dis. Infants*. 1928. Mar. Vol. 3. No. 2. English summary p. 32. [In Japanese.] [Children's Clinic, Imperial Univ., Kyoto.]

²² TAKAYA (J.). Experimental Studies on Rabies (Fifth Report). The Influence of Fixed Poison on the Blood-Findings into the Muscles.—*Oriental Jl. Dis. Infants*. 1928. Mar. Vol. 3. No. 2. English summary p. 32. [In Japanese.] [Children's Clinic, Imperial Univ., Kyoto.]

²³ JONNESCO (Démètre). Virulence de l'urine dans la rage humaine.—*C.R. Soc. Biol.* 1927. Vol. 97. No. 36. pp. 1731-1733. [1 ref.] [V. Babès Inst., Bucharest.]

²⁴ GALLI-VALERIO (B.). Symptômes rabiformes non rabiques chez les carnassiers.—*Schweiz. Arch. f. Tierheilk.* 1928. Feb. Vol. 70. No. 2. pp. 72-76. [6 refs.] [Inst. of Hyg. & Parasit. Univ., Lausanne.]

²⁵ GLUSMANN (M.) & SOLOWJOWA (J.). Ueber den diagnostischen Wert der Komplementbindungsreaktion bei Lyssa.—*Ztschr. f. Immunitätsf. u. Experim. Therap.* 1927. Dec. 31. Vol. 54. No. 2. pp. 199-204. [7 refs.] [Bact. Inst., Karkov.]

²⁶ IMIG (Fritz). Die Verwertbarkeit der Komplementbindungsreaktion zur Diagnose der Bornaschen Krankheit und der Tollwut.—*Ztschr. f. Immunitätsf. u. Experim. Therap.* 1928. Mar. 27. Vol. 55. No. 3-4. pp. 403-421. [9 refs.]

²⁷ REMLINGER (P.). Sur la vaccination antirabique au moyen de moelles glycerinées fraîches (méthode de Calmette-Remlinger).—*Bull. Soc. Path. Exot.* 1927. Nov. 9. Vol. 20. No. 9. pp. 843-846. [3 refs.] [Pasteur Inst., Morocco.]

(ISABOLINSKY and ZEITLIN, this *Bulletin*, Vol. 23, p. 691), since 1925. In all, 3,500 persons have been treated, and amongst these five deaths were reported. This is a low mortality for Russia, where bites are severe.

GLUSMANN, KOWALEWA and PREDTETSCHENSKAJA²⁸ contrast the Högyes-Phillips and the Fermi methods. Of 17 rabbits treated by the former method eight contracted rabies and, in the case of three of the eight, fixed virus was proved by further experiment to be present in the brain. The animals died either during the period of treatment or shortly after. In a second series of twenty-one rabbits treated with Fermi's vaccine, three deaths from rabies were observed. It is claimed that subsequent testing of the surviving animals showed that the latter vaccine was at least as potent in producing immunity as the former.

In a second communication GLUSMANN and SCHMIDT-WEYLAND²⁹ report further experiments on the effects of immunization by Fermi's method. From their observations the authors conclude that Fermi's vaccine is not harmful when injected subcutaneously into rabbits and guineapigs, but may be infective in the case of dogs.

REMLINGER and BAILLY³⁰ report the results of experiments in which local immunization was employed; i.e., emulsions of glycerinated cords and of ether vaccines were rubbed on to the abraded skin. It appeared that eight or more frictional doses were necessary for the production of immunity. Of forty-eight guineapigs treated by this method with eight inunctions, nine contracted rabies (19 per cent.), whilst of forty-six control animals twenty-six developed the disease (56 per cent.).

SANARELLI³¹ discusses treatment by the Italian and Sardinian methods. FERMI³² points out that in describing the Sardinian method SANARELLI has in reality detailed SEMPLE's modification of it, according to which the virus is killed by heating at 37° for 24 hours. FERMI cites the following experimental results, in favour of his own method.

Method.	Percentage saved.	Animals.	Number employed.
Fermi	75-100...	Dogs	17
Semple	40- 60...	"	
Fermi	50 ...	Rabbits	16
Semple	25- 40...	"	
Fermi	100...	White rats	178
Semple	60...	"	

²⁸ GLUSMANN (M.), KOWALEWA (O.) & PREDTETSCHENSKAJA (L.). Zur Frage der Unschädlichkeit des Virus fixe bei subcutaner Injektion.—*Ztschr. f. Hyg. u. Infektionskr.* 1928. Jan. 30. Vol. 108. No. 2. pp. 426-438. [9 refs.] [Bact. Inst., Charkow.]

²⁹ GLUSMANN (M.) & SCHMIDT-WEYLAND (P.). Zur Frage der Unschädlichkeit des Virus fixe bei subcutaner Injektion. II. Mitteilung.—*Ztschr. f. Hyg. u. Infektionskr.* 1928. Apr. 30. Vol. 108. No. 3. pp. 594-604. [3 refs.] ["Robert Koch" Inst., Berlin.]

³⁰ REMLINGER (P.) & BAILLY (J.). La vaccination locale dans la rage.—*Ann. Inst. Pasteur.* 1928. Apr. Vol. 42. No. 4. pp. 349-355. [6 refs.]

³¹ SANARELLI (José). Tratamiento de la rabia por el método italiano de las vacunas fenicadas.—*Semana Méd* 1927. Nov. 24. Vol. 34. No. 47 (1767). pp. 1421-1423.

³² FERMI (Claudio). Tratamiento de la rabia por el método italiano de las vacunas fenicadas. Rectificación al Profesor D. José Sanarelli.—*Semana Méd.* 1928. Mar. 29. Vol. 35. No. 13. pp. 805-807.

This table summarizes the results of 16 experiments. The point is of importance and should be settled once and for all by a single experiment on a large scale.

SCHABUROW³³ has employed anti-rabic serum (the titre of which was such that 1 cc. of a 1 per cent. emulsion of fixed virus was rendered avirulent by 0.17 cc. of the serum), in the case of persons severely bitten by wolves. Fifty persons, so bitten, were treated in the ordinary way, but on the first three days they received in addition 5-10 cc. of anti-rabic serum. Of these two died, or 4 per cent.—a rate which was lower than was found in the case of persons to whom vaccinal treatment alone had been administered.

vi. Statistics.

OUCHAKOW³⁴ states that during the year 1926, 4,140 persons received anti-rabic treatment at Leningrad. Of these 2,150 were definitely "at risk." Three deaths occurred (0.14 per cent.) and one of these was a "failure." The treatment employed in the beginning of the year was the dried cord method, but in April the method of Fermi was substituted. One case of paralytic accident is reported (treated with Fermi's vaccine). During the year Fermi's vaccine was distributed to nine dispensaries. This was used in the treatment of 2,930 persons, and gave a mortality rate of 0.1 per cent.

HEMPT³⁵ reports from Novi-Sad (Yugoslavia) that during the year 1926, 3,059 patients were treated, of whom four died of rabies (0.13 per cent.). The vaccine used had been rendered completely avirulent by exposure to ether. He reiterates his opinion that whilst vaccine kept in ether for 72 hours is harmless to normal persons, it may not be so in exceptional cases, and in particular in the case of persons suffering from some pre-existing nervous affection. For this reason since 1925 he has only used avirulent vaccines. He finds that these are of equal value as regards their immunizing properties, and have the advantage that they can be used without risk in neuropathic cases. Full details of schemes of dosage are given.

McKENDRICK³⁶ summarizes evidence obtained from cases treated at Kasauli (India) from 1900 to 1925. The statistics show that as good results were obtained by the use of carbolized vaccines (mortality 1.16 per cent. in 84,844 cases) as with either dried cords (mortality 1.81 per cent. in 5,141 cases) or dilutions of fresh nerve substance (mortality 1.61 per cent. in 8,435 cases). The relatively high mortalities in Indian statistics are shown to be due to the greater degree of risk run by the Indian. As compared with the European the Indian is more

³³ SCHABUROW (A.). Materiale zur Frage ueber die Simultanmethode der antirabischen Kur.—*Rev. Microbiol. et Epidémiol.* 1927. Vol. 6. No. 4. German summary p. 475. [In Russian pp. 420-422.] [Veter. Bact. Inst., Saratov.]

³⁴ OUCHAKOW (W. G.). Service antirabique de l'Institut de la Médecine Expérimentale. Rapport annuel pour l'année 1926.—*Arch. Sci. Biol.* 1927. Vol. 27. No. 4-5. French summary p. 397. [In Russian pp. 297-306.] [Inst. of Exper. Med., Leningrad.]

³⁵ HEMPT (Adolph). Bericht ueber die Tätigkeit der Wutschutzabteilung des Staatlichen Hygienischen Institutes zu Novi-Sad (Jugoslawien) im Jahre 1926, nebst Mitteilungen ueber den derzeitigen Stand des daselbst geübten abgekürzten Wutschutz-Impfverfahrens.—*Seuchenbekämpfung.* Vienna. 1927. Vol. 4. No. 4. pp. 204-210; 1928. Vol. 5. No. 1. pp. 57-62. With 1 text fig

³⁶ McKENDRICK (A. G.). Antirabic Treatment in India. A Statistical Study of Methods of Pasteurian Treatment.—*Cent. f. Bakt.* I. Abt. Orig. 1928. Vol. 106. pp. 104-110 [Lab., Royal College of Physicians, Edinburgh.]

severely bitten, is more frequently bitten on the bare skin (73 per cent.) and more frequently arrives late for treatment (40 per cent. more than one week late). The mortality amongst 10,834 European patients treated by the three methods, were: dried cords 0.41 per cent., Högyes 0.42 per cent., Semple's vaccine 0.40 per cent. From a closer analysis of figures relating to 20,000 Indian patients, the following conclusions are arrived at. (1) The chance of infection increases with the number of tooth marks. (2) A deep bite is about five times as dangerous as a superficial bite. (3) Interposition of clothing reduces the mortality in the ratio of 6.6 to 1, cauterization in the ratio of 4 to 3. (4) The length of the incubation period is not affected either by number of bites, depth of bite, interposition of clothing or cauterization, and is thus independent of the effective dose. (5) The benefit of treatment, as indicated by the advantage of early arrival is demonstrated in cases whose periods of incubation are relatively short (head and arm bites) both by a reduction in mortality, and by a lengthening of the incubation period. (6) The period of incubation is primarily dependent on the site of inoculation (head: 27 days, arm: 32 days, leg: 64 days): it is independent of the magnitude of the effective dose: it is prolonged as a result of pasteurian treatment.

vii. *Paralytic Accidents.*

REMLINGER³⁷ draws attention to the fact that the paralytic accidents which occur when Högyes method is employed have a higher mortality than those with dried cords. This point was emphasized at the Rabies Conference by PFEIFFER, NEUFELD, HEMPT, and MCKENDRICK, who presented evidence that dilutions of fresh living virus may in exceptional cases convey rabies, and has already been referred to (this *Bulletin*, Vol. 25, p. 188). He deals in a second paper with BAILLY³⁸ with the experimental aspects of this question. As the results of certain observations they suggest that in order to determine whether street or fixed virus is present, in addition to differentiation by the presence or absence of Negri bodies, both subdural and intra-ocular inoculation into rabbits should be performed. This suggestion depends upon the fact that fixed virus is adapted to nervous tissue, whilst (in the case of the Tangier virus) it appears to have lost its infectivity when introduced intra-ocularly.

BURNET³⁹ reports experiments designed to test whether intensive treatment with glycerinated nerve material may cause paralytic accidents. No paralyses were observed in 10 rabbits which had received 80 injections of 15 mgm. each of fixed virus brain, but one out of 10, which had received a similar treatment with normal brain substance, developed paralysis.

QUAST's observation (this *Bulletin*, Vol. 23, p. 693) that he had been able to demonstrate the presence of fixed virus in the brain of a patient

³⁷ REMLINGER (P.). Sur la fréquence et la gravité des paralysies susceptibles d'apparaître au cours du traitement antirabique par la méthode d'Högyes. —*C.R. Soc. Biol.* 1928. Jan. 20. Vol. 98. No. 2. pp. 103-105. [8 refs.]

³⁸ REMLINGER (P.) & BAILLY (J.). Est-il possible de déceler, dans un cerveau rabique, l'existence simultanée du virus de rue et du virus fixe? —*C.R. Soc. Biol.* 1928. Mar. 2. Vol. 98. No. 8. pp. 569-571. [2 refs.] [Pasteur Inst. of Morocco, Tangiers.]

³⁹ BURNET (Et.). Traitement antirabique intensif chez le lapin. Absence de virus fixe dans les centres nerveux et rareté des accidents paralytiques. —*C.R. Soc. Biol.* 1928. Feb. 10. Vol. 98. No. 5. pp. 359-360 [2 refs.] [Pasteur Inst., Tunis.]

who died of tuberculous meningitis, during the course of treatment by Phillip's method, without showing any symptoms of rabies, and his subsequent observation that fixed virus was found in the brains of two out of three dogs which had been similarly treated, have aroused considerable attention. These experiments have been repeated by SCHWEINBURG, by NEUFELD and by REMLINGER, (this *Bulletin*, Vol. 24, p. 764) and in no case have QUAST's results been confirmed. QUAST and ROTTER⁴⁰ now present further evidence. They treated eleven dogs in the usual manner with Phillip's vaccine; one developed rabies. The surviving ten healthy dogs, which showed no symptoms of rabies, were killed, and their brains tested by animal experiment. Fixed virus was present in one of these. Thus in the brains of one out of ten healthy dogs (or 3 out of 13 in QUAST's whole experience) the presence of fixed virus was demonstrable. It would thus appear that it is no longer possible to conclude with REMLINGER that "if an individual succumbs with paralytic symptoms during the course of his treatment and if the presence of fixed virus is demonstrated in his brain by means of inoculation into the rabbit, it is justifiable to attribute such a death to fixed virus."

viii. *Miscellaneous.*

BROSCH⁴¹ suggests that mice and rats should be used for diagnostic purposes. BASSET and LABORDERIE⁴² describe a case of rabies in a mule, in which paralysis of the lower jaw was a prominent symptom. PUNTONI⁴³ draws attention to the frequent occurrence of gastro-intestinal symptoms in experimental animals and in dogs. The post-mortem appearances are those of congestion of the same intensity as is observed in the salivary glands and in the pancreas. By short circuiting a loop of bowel he was able to demonstrate an elimination of virus from the mucous membrane, similar to that from the salivary glands. He concludes that the virus may be eliminated from all digestive surfaces as well as from the various alimentary glands.

HERRMANN⁴⁴ quotes experiments from which he concludes that a single subcutaneous or intra-muscular dose of fresh fixed virus, as large as it is safe to use without running the risk of conveying infection, fails to give adequate protection. With his 58-60° carbolized vaccine he obtained as good protection as with fresh virus, but a single dose was not sufficient to protect against a subdural test.

⁴⁰ QUAST (Gerhard) & ROTTER (Rudolf). Ueber das Vorkommen von Virus fixe im Gehirn wutschutzgeimpfter Hunde.—*Cent. f. Bakt. I. Abt. Orig.* 1928. Vol. 106. pp. 313-325. With 7 text figs. [16 refs.] [Hyg. Inst. & Psychiat. & Nerve Clinic, Univ., Breslau.]

⁴¹ BROSCH (Jos.). Ueber das Verhalten der Muriden nach Lyssainfektion unter besonderer Berücksichtigung der Brauchbarkeit dieser Tierarten für den diagnostischen Tierversuch.—*Cent. f. Bakt. I. Abt. Orig.* 1928. Jan. 16. Vol. 105. No. 4-5. pp. 192-200. With 7 figs. (4 coloured) on 2 plates. [15 refs.] [Federal Inst. for Animal Disease Prevention, Mödling, near Vienna.]

⁴² BASSET (J.) & LABORDERIE. Rage chez un mulet. Observations sur le diagnostic expérimental de la rage.—*Rev. Vét.* 1928. Feb. Vol. 80. pp. 76-85. With 3 text figs.

⁴³ PUNTONI (Vittorio). L'eliminazione del virus rabico per le vie digerenti e le lesioni gastro-enteriche nella rabbia.—*Ann. d'Igiene.* 1928. Jan. Vol. 38. No. 1. pp. 1-22. [15 refs.]

⁴⁴ HERRMANN (Otto). Ueber einmalige obligatorische Schutzimpfung der Hunde gegen Tollwut.—*Cent. f. Bakt. I. Abt. Orig.* 1928. Apr. 18. Vol. 107. No. 1-3. pp. 84-94. [25 refs.] [State Inst. of Med. Instruction & Central Malaria Station, Kasan, Korea.]

THOMAS⁴⁵ in discussing the prevalence of rabies in Haiti, states that the cheapest and most efficient method of killing stray dogs is to connect the exhaust pipe of an automobile with an air-tight box in which the animal is placed. SHORE⁴⁶ considers that the elimination of rabies from the United States of America is not an insurmountable problem, and that immediate measures should be taken with this object.

PICKENS and REED⁴⁷ state that as the result of enquiries in all the forty-nine of the United States of America it appears that a total of ninety-one cases was reported in 1926 (Oklahoma : 20, Tennessee : 19, Louisiana : 10, Kansas : 8). Compulsory vaccination is enforced in three states. RICE and BEATTY⁴⁸ deal with the same set of enquiries.

A. G. McKendrick.

⁴⁵ THOMAS (G. C.). Rabies in Haiti.—*U.S. Nav. Med. Bull.* 1928. Apr. Vol. 26. No. 2. pp. 315-320.

⁴⁶ SHORE (C. A.). Rabies an Unnecessary Disease.—*Southern Med. Jl.* 1928. May. Vol. 21. No. 5. pp. 397-399.

⁴⁷ PICKENS (E. M.) & REED (R. C.). A Résumé of the Laws and Regulations for the Control of Rabies, together with Data on the Prevalence of the Disease in the Different States.—*Cornell Vet.* 1927. Oct. Vol. 17. No. 4. pp. 386-400 [Dept. of Bact., Univ. of Maryland, College Park, Md.]

⁴⁸ RICE (Thurman B.) & BEATTY (Norman). The Prevalence of Rabies in the United States and the World.—*Amer. Jl. Public Health.* 1928. Apr. Vol. 18. No. 4. pp. 421-428 With 6 text figs. (2 maps). [4 refs.]

MİYAGAWA (Yoneji) & ISHII (Shintaro). On the Influence of the Constituents of Central Nerve Cells perenterally injected on the Living Organism. (The First Report) Parts I, II & III.—*Japan Med. World.* 1927. Aug. 15, Sept. 15 & Oct. 15. Vol. 7. Nos. 8, 9 & 10 pp. 225-233; 266-274, 296-301. [24 refs.] [Govt. Inst. for Infect. Diseases, Imperial Univ., Tokyo.] [This *Bulletin*, Vol. 25, p. 195.]

REMLINGER (P.). Est-il possible de standardiser le traitement antirabique ? —*Rev. d'Hyg. et de Méd. Préventive.* 1928. Mar. Vol. 50. No. 3 pp. 186-192. [2 refs.] [This *Bulletin*, Vol. 25, p. 187.]

PLANTUREUX (E.). Vaccin antirabique formolé nouvelle méthode, simple et pratique, de vaccination préventive des chiens contre la rage.—*Arch. Inst. Pasteur d'Algérie.* 1927. Dec. Vol. 5. No. 4 pp. 475-480. [5 refs.] [Pasteur Inst., Algiers.] [This *Bulletin*, Vol. 25, p. 195.]

MEDICAL ZOOLOGY.

FAUST (Ernest Carroll). **The Future for Parasitology in China.**—*China Med. Jl.* 1928. Mar. Vol. 42. No. 3. pp. 180–187. [Peking Union Med. College, Peking, China.]

The author discusses the eight most important animal parasites in human pathology in China, in each case reviewing the progress of knowledge and indicating apt lines of further investigation. Of malaria very little is known beyond that it is more or less pandemic in China, except in the north-west ; so that the entire field of inquiry antecedent to control is open. Amoebiasis is known to be common throughout China, with a great preponderance of carrier-cases in the north ; the factors responsible for this uneven incidence of acute cases, the clinical significance of the carrier-case, the pathogenous significance to man of pig and cat carriers of the amoeba, are questions still to be settled. Kala azar is known to be restricted to a belt north of the Yangtse-kiang ; the explanation of this restriction, the possible existence of a natural reservoir of infection, the exact method of transmission to man, are matters that require investigation. Although the distribution of Oriental schistosomiasis and the life-cycle of *S. japonicum* are well known, further study is desirable of the distribution of the molluscan intermediary host, of the methods by which eggs passed in faeces reach the vicinity of that host, of the possible existence of reservoir hosts, of feasible methods of local control, and of therapeusis. Of Clonorchis infection it is known that in man it is acquired, almost without exception, in two prefectures of the Kwangtung Province, and can be avoided by abstinence from raw or insufficiently-cooked freshwater fishes, and also that sterilization of nightsoil will kill the unhatched larvae ; but the practical and inexpensive application of the last item of knowledge is open to study, as also is the therapeutic aspect of this infection. *Fasciolopsis buski* is a widespread infestation of man and pig south of the Yangtse basin, and the fundamental stages of its life-cycle are known ; the exact relation between porcine and human cases, and the possibility of the dog as a reservoir host are questions for study ; also further and more comprehensive study is needed of the possible modes of infection. Hookworm in China seems to have been so fully investigated that the sterilization of night-soil by ammonium sulphate, which is mortal to eggs in night-soil mixtures in 24 hours, can be recommended as a principle of control to be developed practically in places where hookworm is prevalent. The Filariasis problems that the author suggests for further investigation are, the migration-route in the human host, the meaning of periodicity, and the actual relation of the adult worms to elephantiasis.

In conclusion the author recommends the domestic animals to the attention of the parasitologist, and particularly the dog and the cat. He knows nothing in the world like the filthy, verminous, omnivorous pariah dog of China as a delightful object of attentive parasitological study ; no higher recommendation of the creature surely can be given than that it frequently is infested with ascarids and hookworms before birth. Then besides pigs, cattle, sheep, and goats, there are camels, horses, donkeys, and mules, all of which are slaughtered for food in Northern China, and can therefore be examined conveniently. Furthermore there is a great variety of wild game brought to market with the

viscera all intact. The extent and variety of the field is such that the author considers it to be almost beyond the visual powers of a specialist in human parasitology.

A. Alcock.

SCHILLING (Claus). Heilung und Immunität bei Protozoenkrankheiten. [**Recovery and Immunity in Protozoal Diseases.**]—*Deut. Med. Woch.* 1927. Sept. 9. Vol. 53. No. 37. pp. 1543–1545.

The facts discussed in this paper are familiar and the argument moves about them in well-beaten tracks, appearing to favour the conclusion that a specific protozoan immunity depends upon the long-persistence in a greatly diminished degree (latency, premunition) of the original infection and would cease if the infection were entirely and conclusively eradicated.

A. A.

MELONEY (Henry Edmund). **The Teaching of Medical Parasitology.**—*Jl. Amer. Med. Assoc.* 1928. Apr. 14. Vol. 90. No. 15. pp. 1188–1189. [Vanderbilt Univ. School of Med., Nashville, Tenn.]

Whoso teaches medical parasitology must be a first-class zoologist (invertebrata) and no mean clinician, and since the two qualifications are now not likely to be combined in one individual the course had better be conducted by a zoologist and a clinician in co-operation. The course should come in the third year of the curriculum; for if it be placed among the preliminary scientific studies the student may have forgotten his zoology before he encounters the parasites in pathology. The subject should be taught as a course—of 75 to 100 hours—on parasitic diseases; and as each parasite is studied in its biological aspects the disease attributable to it should be studied in its pathological, clinical and preventive aspects. Parasites of the lower animals may be introduced wherever they assist in simplifying studies. An attempt has been made to apply these principles in the course on parasitic diseases at the Peking Union Medical College.

A. A.

KESSEL (John F.). **Host-Parasite Relationships of Certain Intestinal Protozoa Important to Medical Zoology.**—*Jl. Amer. Med. Assoc.* 1928. Apr. 7. Vol. 90. No. 14. pp. 1089–1092. [24 refs.]

The author judiciously dissents from the uncritical assumption that the relations between a host and its intestinal protozoan parasites are always rigidly specific; it is probable that they sometimes are so, but they cannot be admitted to be so until the parasite has been studied culturally and in the results of experimental cross-infestation. The author himself has established the following transferences from one species of host to another: *E. dysenteriae* and *E. coli* and *Endolimax nana* of man to white rat, monkey, and pig. Iodamoeba of man to monkey and white rat. Dysentery amoeba of monkey to pig. Chilomastix of man to monkey and pig. Trichomonas of man to monkey. Trichomonas of man and of monkey and of pig and *Trichomonas parva* of white rat all to kittens. In his experimental studies of amoebiasis in kittens identical gross and microscopic phenomena were produced in the kitten by dysentery amoeba from the following different

sources: monkey direct, pig direct, pig via monkey, man via pig. His few attempts to transfer *Giardia* of men to monkeys and pigs and kittens have been unsuccessful, so far. The author discusses his own experiments and the observations of other workers.

A. A.

HEGNER (Robert). **Clinical Diagnosis of Human Intestinal Protozoa.**—*Internat. Clinics*. 1927. Vol. 4. Ser. 37. pp. 159–174. With 31 figs. on 3 plates. [30 refs.]

A concise and critical conspectus of the subject, including besides a catalogue of species and a clear figure of each with a statement of its particular location and its character—whether definitely pathogenous or not—an explicit account of classical methods of collection and manipulation of material and of cultivation and differential diagnosis of species.

A. A.

DA CUNHA (A. Marques). Protozoários intestinaes das crianças no Rio de Janeiro. [**Intestinal Protozoal Infections in Children in Rio de Janeiro.**—*Sciencia Med.* 1928. Mar. Vol. 6. No. 3. pp. 103–109.]

Of faeces from 805 individuals, 21·73 per cent. were found infected with Protozoa, by single examinations. The stools were sent for evidence of helminthic ova, or on account of obscure intestinal disturbance; most were examined in saline, some with iodine, and a few by iron-haematoxylin staining. The following species and percentages are noted: *Giardia*, 12·17 per cent.; *E. coli* 7·08; *Chilomastix* 2·48; the vegetative form of *E. histolytica* once only, the cysts five times (0·42), *Balantidium coli* on a single occasion. Double infection was discovered in 36 cases, or 4·47 per cent. of the total, *E. coli* with *Giardia* ten times; triple infection in seven instances, *Trichomonas*, *Chilomastix*, and *Enteromonas* twice, the rest, among them *E. coli*, *Chilomastix*, and cysts of *E. histolytica*, once.

H. Harold Stott.

SDRODOWSKI (P.). Zur Charakteristik der Darmprotozoen bei Menschen in Aserbeidschan. [**Intestinal Protozoa in Man in Azerbaijan.**—*Abhandl. a. d. Gebiet d. Auslandskunde. Hamburg. Univ.* 1927. Vol. 26. (D., Med. & Vet. Vol. 2). [Festschrift NOCHT.] pp. 512–516. [State Bact. Inst., Baku.]

In a systematic examination of the stools of 300 men of the garrison of Baku, 242 were found infested with Protozoa. The specific percentages were *Entamoeba coli* 41·8; *E. histolytica* (or at any rate 4-nucleate cysts), 24·3; *Lambliia*, 18·7; *Chilomastix mesnili*, 12·3; *Endolimax nana*, 12·0; *Iodamoeba buetschlii*, 7·0. The author mentions that Dr. WOSKRESENSKI examined 122 stools for intestinal worms and found 100 per cent. infested. He also mentions that among the surrounding native population heavy infestation with intestinal protozoa and 100 per cent. infestation with intestinal worms was observed, and furthermore that of 100,000 spleen and blood examinations made during the course of six years, the percentage of malaria infections ranged between 54 and 67 per cent.

A. A.

KIRBY, Jr. (Harold). **Notes on Some Parasites from Chimpanzees.**—*Proc. Soc. Experim. Biol. & Med.* 1928. May. Vol. 25. No. 8. pp. 698–700. [10 refs.] [Osborn Zoolog. Lab., Yale Univ.]

These chimpanzees had been in the laboratory for about 6 months when the examination of their faeces began. A *Balantidium* not distinguishable from *B. coli* was continually present in large numbers (in all of them apparently), usually in the active state, very rarely encysted. The infested stools were more often soft than shaped and occasionally were diarrhoeic, but the apes were healthy and did not appear to suffer. *Troglodytella abressarti* also was abundant at first, but soon became scarce and at many subsequent examinations was not found in the stools at all. In the mouth of two of the apes an *Entamoeba* closely resembling *E. gingivalis*, but "remarkable for its eruptive manner of forming pseudopodia" was found.

A. A.

TORRES (C. Magarinos). Sur une nouvelle maladie de l'homme, caractérisée par la présence d'un parasite intracellulaire, très proche du *Toxoplasma* et de l'*Encephalitozoon*, dans le tissu musculaire cardiaque, les muscles du squelette, le tissu cellulaire sous-cutané et le tissu nerveux. [**A New Disease Parasite of Man, *Encephalitozoon chagasi*, found in Muscle and Nervous Tissue.**]—*C.R. Soc. Biol.* 1927. Vol. 97. No. 36. pp. 1778–1781. With 2 text figs.

——. Morphologie d'un nouveau parasite de l'homme, *Encephalitozoon chagasi*, n. sp., observé dans un cas de méningo-encéphalo-myélite congénitale avec myosite et myocardite. *Ibid.* pp. 1787–1790. With 2 text figs. [1 ref.]

——. Affinités de l'*Encephalitozoon chagasi*, agent étiologique d'une méningo-encéphalo-myélite congénitale avec myocardite et myosite chez l'homme.—*Ibid.* pp. 1798–1799. [1 ref.] [Oswaldo Cruz Inst., Rio de Janeiro.]

The subject of these studies is an intracellular parasite, finally determined to be a new species of *Encephalitozoon*, discovered in the tissues specified above—but not detected in any other tissue or organ, or in the blood—at the autopsy on the body of a well-formed two-day-old female infant (of the Caucasian race) at Rio de Janeiro. General tonic contraction of the muscles, breaking up in fatal convulsions, was the ephemeral life-history.

The striking feature at the post-mortem examination appears to have been a multitude of small yellow nodules, the largest about the size of a pin-head, the smallest just visible, scattered throughout both cerebral hemispheres and about the foramen of Vieussens. In these small inflammatory lesions, as outside them, and as also in the subcutaneous tissue and in inflammatory nodules in the skeletal and cardiac muscle, were discovered minute intracellular bodies which in sections of tissue fixed in Zenker's fluid and stained with haematoxylin-eosin were sometimes difficult to distinguish from the *Leishmania* form of *Schizotrypanum cruzi* as seen in sections.

The individual body occurs in two forms—a smaller form containing a single nucleus and not having a limiting membrane, and a larger form containing numerous nuclei and possessing a limiting membrane. The smaller form, as best observed from the subcutaneous tissue, measures

3.5 μ by 1.5 μ , and its cytoplasm stains a uniform rose; its nucleus, which is 1 μ in diameter, round and slightly excentric, and is surrounded by a sort of halo, has a light blue centre and an intensely dark blue periphery. The larger forms, which range from 12 to 41 μ in length and from 7 to 10 μ in breadth and have finely granular cytoplasm and appear to have a limiting membrane, contain from 12 to more than 100 nuclei. The cells in the enveloping foci of inflammation in the brain and muscle are principally mononuclear, though sometimes eosinophiles are abundant. The author concludes that this intracellular body is a parasite congeneric with *Encephalitozoon cuniculi*, and names it *Encephalitozoon chagasi*. He indicates its obvious *differentiae* from *Leishmania* and *Schizotrypanum*, and from *Globidium*, *Rhinosporidium*, and *Toxoplasma*.

A. A.

LEVADITI (C.). Au sujet de certaines protozooses héréditaires humaines à localisation oculaire et nerveuse. [**On Hereditary Protozoal Diseases of Man restricted to the Eye and Nervous System.**]—*C.R. Soc. Biol.* 1928. Feb. 3. Vol. 98. No. 4. pp. 297–299. With 1 text fig. [3 refs.]

With reference to TORRES' discovery of a parasite in the brain of a new-born infant, Levaditi here draws attention to an analogous discovery reported in 1923 by J. JANKU of Prague. In this case the infant, 11 months old, had an enormous hydrocephalus (75 cm. in circumference), congenital microphthalmus, and deficiency of the macula lutea. Histological examination revealed chronic inflammatory changes in the choroid and retina (of both eyes) and the presence there of "ovoid sporocysts of a parasitic nature, measuring 20 to 30 μ in diameter, and containing sporozoites," but of affinities difficult to determine. JANKU decided that he was dealing with an inflammation contracted during foetal life and provoked by a Protozoon transmissible through the placenta. Levaditi is struck by the analogy between the observations recorded in these two cases, particularly in TORRES' case, and his own experience of the hydrocephalic and other changes in the brain of rabbits, infected with *Toxoplasma cuniculi*, and he proposes to seek further light by an investigation of the axial nervous system of congenital hydrocephalics.

A. A.

LEVADITI (C.) & SCHOEN (R.). Pénétration et pullulation de protozoaires dans la cellule nerveuse (neuroprotozooses). [**Penetration and Multiplication of Protozoa in the Nerve Cell.**]—*C.R. Acad. Sci.* 1928. June 4. Vol. 186. No. 23. pp. 1584–1586. With 8 text figs. [6 refs.]

The authors have shown that *Toxoplasma cuniculi* injected into the brain or the retina of rabbit and mouse may penetrate the local neurones and encyst there. JANKU has demonstrated undoubted protozoan parasites in the retina of a hydrocephalic infant having a coloboma of the macula lutea. DOFLEIN has described microsporidian cysts (*Nosema lophii*) in the ganglion cells of the common frog-fish (*Lophius piscatorius*). SPIELMEYER has made known what appear to be protozoan parasites in the neurones of the cerebral cortex in a case of congenital amaurotic idiocy. The authors think that all these facts tell for the theory of the microsporidian nature of the rabies virus.

A. A.

KOFOID (Charles Atwood). On *Councilmania dissimilis* sp. nov., an Intestinal Amoeba from Man.—*Univ. California Public. Zool.* 1927. Aug. 23. Vol. 31. No. 2. pp. 7-16. With 16 figs. on 2 plates. [6 refs.]

In 1921 KOFOID and SWEZY decided that under the name *Entamoeba coli* two distinct amoebae of the human intestine had been grouped together. The one of these retained the name *Entamoeba coli* and the other was placed in a distinct genus as *Councilmania lafleuri*. The reason for this somewhat revolutionary procedure was that in certain supposed *E. coli* infections, the amoebae showed a clear and definite ectoplasm, the nucleus had a diffuse karyosome consisting of a cluster of granules, while the cysts showed what was interpreted as budding through a pore in the cyst wall. Having concluded that these features amongst others justified the division of *Entamoeba coli* into two species and the establishment of a new genus, it would be only logical to suppose that if any other intestinal amoebae showed similar characters and variations then a similar splitting would be carried out. This has already been done in the case of the intestinal amoebae of rats and mice, and now finally in the paper under review *Entamoeba histolytica* suffers a similar disruption, for in certain infections it is stated that the amoeba has a dispersed karyosome while the cysts show a tendency to budding. The author having taken up a certain position in the first instance, with the courage of his convictions now divides *Entamoeba histolytica* into a form which retains this name and a new species *Councilmania dissimilis*. The author, moreover, considers that KUENEN and SWELLENGREBEL's *Entamoeba tenuis* also belongs to the genus *Councilmania*, for he refers to it as *C. tenuis* in making the statement that "*Councilmania dissimilis* is less frequent in man than either *C. lafleuri* or *C. tenuis*." It would appear that in course of time every known species of *Entamoeba* will be either split into two to make room for a species of *Councilmania* or be transferred to this genus.

[The reviewer on a previous occasion (this *Bulletin*, Vol. 22, p. 333) gave his reasons for doubting the validity of the genus *Councilmania* and this last communication of the Californian School of Protozoology still further strengthens his position. He prefers to adhere to the view that, as in the case of *Entamoeba coli* and *Councilmania lafleuri*, the characters which are employed to establish the species *Councilmania dissimilis* are actually variations, real or artificial, within the range of *Entamoeba histolytica* itself.]

C. M. Wenyon.

SMITH (Septima C.). Host-Parasite Relations between *Iodamoeba williamsi* and Certain Mammalian Hosts (Guinea Pigs and Rats).—*Amer. Jl. Hyg.* 1928. Jan. Vol. 8. No. 1. pp. 1-15. With 34 figs. on 3 plates. [21 refs.] [School of Hyg., Johns Hopkins Univ., Baltimore, Md.]

For the experiments recounted in this paper guineapigs and rats were employed. The following are among the facts elicited: That excystation of *Iodamoeba williamsi* occurred in the jejunum between 1 and 3 hours after ingestion of cysts—the ingested cysts having been those both fresh-passed and up to 36 hours old; that generally the excysted trophozoites survived less than 7 hours, and that the caecum was indicated as the place of destruction; and that the number of rats that became infected with *I. williamsi* from eating food that contained cysts

"was greater among young amoeba-free animals than among old amoeba-free animals or young animals known to possess an infection with the rat amoeba." It is noted that the wall of the empty cyst, after the complete issue of the amoeba, appeared intact; also that *in vitro* the only essentials for excystation are moisture and a suitable temperature (37°–40° C.).

A. A.

SMITH (Septima C.). **Polar Planimeter Measurements of Cysts of *Iodamoeba williamsi*.**—*Jl. Parasit.* 1927. Dec. Vol. 14. No. 2. pp. 97–101. With 2 text figs. [2 refs.] [School of Hyg., Johns Hopkins Univ., Baltimore, Md.]

Considering the irregularity and variability of shape of the cysts of *Iodamoeba williamsi* and the consequent difficulty of standardizing their size for practical purposes, the author proposes to measure them, not by their diameter, but by their area. For technical details those interested in this academic discussion must consult the original paper.

A. A.

PACHECO (Genesio). Sur la fréquence des kystes d'amibes et d'autres protozoaires dans des fèces, apparemment normales, provenant des zones suburbaines et rurales de Rio-de-Janeiro. [**Frequency of Amoebic and other Cysts in the Faeces from Rio and Surroundings.**]—*C.R. Soc. Biol.* 1928. May 25. Vol. 98. No. 17. pp. 1560–1561. [3 refs.]

The author does not confirm BRUMPT's estimate of the existence of 100,000 carriers of quadrinucleate cysts in Buenos Aires. In 220 individual faecal examinations (exclusive of catarrhal and sanguineous faeces containing vegetative forms) amoeba cysts were found in only 7.2 per cent., and cysts of *Entamoeba histolytica* in only 1.8 per cent.

Other Protozoa found were *E. coli* (cysts) 4 per cent., Amoeba of *limax* type 0.4 per cent., *Iodamoeba buetschlii* (cysts), and cysts of *Giardia* and *Chilomastix*.

A. A.

BACIGALUPO (J.). *Entamoeba coli* parasitée par une *Sphaerita*. [*E. coli* parasitized by a *Sphaerita*.]—*C.R. Soc. Biol.* 1928. Jan. 20. Vol. 98. No. 2. pp. 170–171. [2 refs.] [Central Military Hosp., Buenos Aires.]

The author has observed *Sphaerita* twice in *Endolimax nana*, twice in *Entamoeba coli*, and once in *E. histolytica*.

A. A.

HEGNER (Robert). **Experimental Studies on the Viability and Transmission of *Trichomonas hominis*.**—*Amer. Jl. Hyg.* 1928. Jan. Vol. 8. No. 1. pp. 16–34. [12 refs.] [School of Hyg., Johns Hopkins Univ., Baltimore, Md.]

Since *Trichomonas hominis* exists only as a trophozoite it is interesting to know how long it can live away from its host. The author's experiments, here condensed, show that in infected faecal matter at room temperature of about 70° F.—and even in incubators at 77° F. and 89° F.—very few remained alive after 48 or 72 hours, though survivors might hold out for as long as 8 days; at 104° F. and 111° F. none could be

found after 5 hours. In infected faeces deposited on ordinary garden soil in the shade in wet and cloudy weather with the thermometer ranging between 54° F. and 66° F., only a slight fall in numbers was noticed during the first 24 hours, but very few were present at the end of 72 hours, cultures, however, being positive on the 7th day; on sandy soil the deposit sank, and cultures from the contaminated sand could not be obtained after 12 hours. The flagellate can live for several days in infected faeces diluted to a moderate extent (up to 25 gm. in 75 cc.) with tap water; but in high dilutions, e.g., 1 gm. of infected faeces in 99 cc. of water, it lives usually about one hour, although positive cultures were obtained at the end of 5 or 6 hours. Cockroaches eat infected faeces freely, but very few flagellates reach the stomach alive, and the further passage onwards is so slow that it is highly improbable that any are evacuated alive. The living flagellates were found in the droppings of common domestic flies (*Cynomyia cadaverina*, *Musca domestica*, and *Lucilia sericata*) passed (at intervals) between 20 minutes and 6 hours after ingestion of infected faeces, and cultures were obtained from the droppings up to 4 hours after. Lysol even in a 0.5 per cent. solution destroys all trichomonads in faecal matter in five minutes; but a 0.5 per cent. solution of creolin does not, nor does a 1 per cent. solution of carbolic acid—though of course solutions double these strengths are fatal in 5 minutes.

A. A.

HEGNER (Robert). **The Ingestion of Red Blood Corpuscles by Trichomonad Flagellates. Observations showing that it is Not Evidence of Pathogenicity.**—*Jl. Amer. Med. Assoc.* 1928. Mar. 10. Vol. 90. No. 10. pp. 741-742. [12 refs.]

The casual ingestion of red blood cells by amoebae and flagellates has been regarded by some as evidence of a pathogenous bent, but the experiments here described show that flagellates ingest red cells just as they take up bacteria or any other organic food-particles in their environment. In this series of experiments eight species of trichomonads from different animals were grown in serum-saline-citrate medium, and blood from seven different species of mammals was supplied to each culture tube. It was found that every species of trichomonads ingested red cells of each and every species of mammals. The following table of results is interesting:—

Percentage of Trichomonads that Ingested Red Cells according to the Number ingested by each regardless of the Source of the Red Cells.

Source of Trichomonads ...	Number of Red Cells Ingested.							
	0	1	2	3	4	5	6	7
Intestine of Man ...	58	23.4	12	4.8	1	0.4	0.14	0.14
Mouth of Man ...	47.1	33.7	9.8	7.1	1.7	0.4	—	—
Intestine of Monkey	89.9	7.6	1.5	0.57	0.28	0.14	—	—
Vagina of Monkey ...	73	17.7	6.15	2.4	0.4	0.28	—	—
Intestine of Cat ...	54.5	28.6	10.04	5	1.14	0.4	0.14	—
Caecum of Rat ...	81.5	14.8	3.1	0.57	—	—	—	—
Caecum of Chicken ...	90.3	8.4	0.84	0.28	0.14	—	—	—
Rectum of Frog ...	92.5	4.15	1.86	0.71	0.4	0.14	—	—

A. A.

VARELA, GARCIA DE SAN MARTIN (H.) & RUBINO (P.). La tricomonosis vaginal en la etiologia del prurito vulvar. [*Trichomonas vaginalis* as a Cause of Vulval Pruritus.].—*Prensa Méd. Argentina*. 1927. Dec. 30. Vol. 14. No. 21. pp. 781-785. [4 refs.]

Two cases of intense and obstinate pruritus vulvae concurrent with large numbers of *Trichomonas*, cured by corrosive sublimate douches (1 : 2000) followed by tampons of boric-glycerin.

H. Harold Scott.

HOGUE (Mary Jane). **The Effect of *Bacillus pyocyaneus* on Cultures of *Trichomonas hominis*.**—*Amer. Jl. Hyg.* 1928. Jan. Vol. 8. No. 1. pp. 85-88. [3 refs.] [School of Med., Univ. of Pennsylvania, Philadelphia, Pa.]

The author reports that *Pseudomonas pyocyanea* prevents the growth of *Trichomonas hominis* in saline-serum cultures, unless in deep cultures under paraffin oil.

A. A.

CARRIEU (M.) & RAMBAULT-SIMON (Mme.). Etude des flagellés de l'intestin humain dans la région de Montpellier. [**Flagellates of the Human Gut in the Montpellier District.**].—*Arch. des Malad. de l'Appareil Digestif*. 1927. June. Vol. 17. No. 6. pp. 658-669. [27 refs.]

During the academic year 1925-26 the authors carried on a systematic examination of the stools of 212 medical and surgical patients of all descriptions at Montpellier. In only 17 patients were flagellatés observed—*Trichomonas hominis* in 9, *Giardia "enterica"* in 6, *Chilomastix mesnili* in 2. In 15 cases out of the 17 the stools were abnormal in character; but only in the case of *Giardia* were definite intestinal troubles a constant concomitant. In treatment chloride of calcium, stovarsol, essence of turpentine, thymol were all tried, but in no case did a complete cure result.

A. A.

POTTER (Louis A.). **Two Species of *Giardia* from the Rat.**—*Amer. Jl. Hyg.* 1928. Jan. Vol. 8. No. 1. pp. 77-84. With 4 text figs. [10 refs.]

This is a careful and well-illustrated report of a comparative study of *Giardia* species undertaken for the identification of two species found together in the same rats, the results furnishing what the author describes diffidently as "strong evidence" that one of them is *G. muris*, and the other *G. lamblia*.

A. A.

SKVORZOWA (E. D.). Contribution à l'étude des lambliaoses duodénales. [**Lambliaosis of the Duodenum.**].—*Russian Jl. Trop. Med.* 1928. Vol. 6. No. 2. French summary p. 142. [In Russian pp. 106-111, 26 refs.]

Case of a man of 27 years who suffered repeated attacks of jaundice, with acute abdominal pain, nausea, vomiting, and rise of temperature to 37.8° C. The last of various attempts at diagnosis was perforating ulcer of the pylorus. Examination of the duodenum, however, disclosed *Giardia* innumerable. Duodenal drainage and intravenous injections of neo-salvarsan had a good effect.

A. A.

DA CUNHA (A. M.) & MUNIZ (Julio). L'enkystement du *Chilomastix mesnili* en culture. [The Encystment of *Chilomastix* in Culture.]—*C.R. Soc. Biol.* 1927. Vol. 97. No. 36. pp. 1777-1778. [Oswaldo Cruz Inst., Rio de Janeiro.]

— & —. Enkystamento do *Chilomastix mesnili* em cultura. [Encystment of *Chilomastix mesnili* in Culture.]—*Bol. Biol. S. Paulo.* 1927. Dec. 15. No. 10. pp. 201-202. With 1 fig.

In cultivating *Entamoeba histolytica* from stools of a dysentery patient which also contained *Trichomonas hominis* and *Chilomastix mesnili*, the authors were surprised at the number of cysts of *C. mesnili* always found after 48 hours at 37° C. in the culture media that contained blood (NNN+ blood with Ringer's fluid and 1 per cent. dextrin). They think this observation of encystment under novel conditions worthy of attention.

A. A.

KNOWLES (R.) & GUPTA (Biraj Mohan Das). Laboratory Studies in Surra. I. On the Role of the Thyroid Gland in Susceptibility and Resistance to a Protozoal Infection.—*Indian Jl. Med. Res.* 1928. Apr. Vol. 15. No. 4. pp. 997-1057. With 10 text figs. [18 refs.]

About four-fifths of the body of this paper is devoted to the study of the course of surra in normal laboratory animals.

As regards the influence of the thyroid on surra infection, the authors conclude from their experiments: (1) that sub-total removal of the thyroid is attended by loss of resistance, a more rapid and acute course of the disease, and earlier death; and (2) that the results of feeding white rats on thyroid are variable and are not always remarkably different from those of control experiments—though an individual animal "here and there seems to respond to intensive thyroid feeding by putting up a markedly increased resistance, with a more prolonged course of the disease and a later death." These individual differences under identical conditions of experiment may, the authors think, be explained by the conclusion of SCHERN—a conclusion confirmed by themselves—that trypanosomes live on the blood sugar and that death in the acute phase of trypanosomiasis (surra in this instance) coincides with a condition of absolute hypoglycaemia; since the blood-sugar content, being dependent upon the activities of the liver and adrenal glands, the control of the thyroid over these activities and over the blood-sugar content must be individually biased.

A. A.

ROSKIN (G.) & SCHISCHLIAIEWA (S.). Die Kernteilung bei Trypanosomen. [Nuclear Division in Trypanosomes.]—*Arch. f. Protistenk.* 1928. Feb. 14. Vol. 60. No. 3. pp. 460-481. With 6 text figs. & 10 coloured figs. on 1 plate. [20 refs.] [Microb. Inst., Education Commissariat, Moscow.]

The author describes, figures, and discusses the fission of the tropho-nucleus in *Trypanosoma equiperdum*, *brucei*, *rhodesiense*, and surra. He describes the process as something peculiar—certainly not amitosis, since there is a definite order in the manner of division of the chromatin; but not at all a typical mitosis. To begin with, the peripheral chromatin and the caryosome of the resting nucleus unite to form a single central mass, and this enlarged caryosome divides into three "mother-chromosomes." (This initial process agrees in the main with SCHULZ's description of nuclear division in *Leptomonas* and with that in *Leishmania tropica* described by

ROSKIN and ROMANOWA). The mother-chromosomes become arranged in a triangle and each divides into two daughter-chromosomes. The six daughter-chromosomes become arranged in two triangles; these draw apart and become separately enveloped, and the chromatin of each daughter nucleus assumes its resting arrangement.

A. A.

CHODUKIN (N. I.). Zur Frage ueber die Protozoa des Darms des Phlebotomus. [On the Intestinal Protozoa of Phlebotomus.]—*Pensée Méd. d'Usbekistane*. Tashkent. 1927. Oct. Vol. 2. No. 1. German summary p. 129. [In Russian pp. 83–87. With 1 text fig. 4 refs.]

The German translation states that Chodukin in Bokhara examined the pharynx and its neighbourhood in 340 female Phlebotomus (*P. li*, *P. sergenti*, *P. papatasi*, and *P. minutus*), caught mostly in houses where sufferers from leishmaniasis were living, and that he found protozoa in 3 of them—namely a trypanosome along with some herpetomonas and crithidia forms in 2, and a *Leishmania tropica* (?) in 1. The trypanosome is described at considerable length, but not critically, and the author is unsure whether it is a new species or derived from another animal—perhaps a camel.

A. A.

FRANCHINI (Giuseppe). Ueber einen Coccidiosisfall beim Menschen, verursacht durch "Isospora Hominis" Rivolta. [A Case of Coccidiosis in Man due to *Isospora hominis*.]—*Abhandl. a. d. Gebiet d. Auslandskunde*. Hamburg. Univ. 1927. Vol. 26. (D., Med. & Vet. Vol. 2). [Festschrift NOCHT.] pp. 115–120. With 6 text figs. [10 refs.]

The patient was a man of 25 years. Dysentery and the occurrence of active *E. histolytica* in the faeces was included in his previous history, but the stools when examined about 11 months prior to the discovery of oocysts were pronounced to be "negative." The development of the oocysts was followed in the laboratory and the species determined to be *Isospora bigemina hominis*. With stovarsol treatment the number of oocysts in the faeces has diminished.

A. A.

HARTMAN (Ernest). Three Species of Bird Malaria, *Plasmodium praecox*, *P. cathemerium* n. sp., and *P. inconstans* n. sp.—*Arch. f. Protistenk.* 1927. Dec. 2. Vol. 60. No. 1. pp. 1–7. With 2 coloured plates. [16 refs.] [Zool. Lab., Univ. of Illinois, Urbana.]

The author remarks that CELLI and SANFELICE, in 1891, noticed three kinds of malaria parasites of birds, but did not name them specifically with a recognizable description for each. He himself in his recent work has been able to distinguish three kinds, all of them existing in the common house-sparrow and transmissible to the canary. One of these species seems to be identical with one of those noticed by CELLI and SANFELICE, said by them to have "a form very similar to a crescent" and named by them *Haemamoeba praecox*. [It is the thing

often spoken of by casual observers of sparrow blood as "halteridium." To this species, "having crescent shaped gametocytes and not markedly different in morphology from *P. falciparum* of man" the author restricts the name *Plasmodium praecox*. The other two species, although no doubt they have been handled and described and figured, are considered by the author to have not received separate exclusive and distinctive specific names, and indeed are known to have had the name "praecox" applied to their photographs. For one of them, having spherical [in the figures very broadly elliptical] gametocytes containing rod-shaped pigment-granules, and trophozoites staining fairly-uniformly without clearly distinct vacuolation and with the pigment either in a single amorphous mass or in a few masses forming a single compact group, the name *Plasmodium cathemerium* is proposed. For the other having (as figured) frankly elliptical gametocytes in which the nearly-spherical pigment-granules are often segregated together in a number of constellations, and trophozoites in which the pigment is scattered and frequently in small granules, the name *Plasmodium inconstans* is proposed.

It may be noticed further that in *P. praecox*, s.r., schizonts are seldom found in the peripheral circulation, and when found are always in the red corpuscles; that in *P. cathemerium* the number of merozoites per schizont ranges from 6 to 24; and that the size of *P. inconstans* is generally less than in the preceding species.

Incidentally the author remarks upon the obliquity of naming "new species" of bird-malaria parasites merely on the basis of the species of host in which the individual observer happens to find the parasite. He himself has transmitted *P. cathemerium* by direct inoculation from the canary to the siskin, to the cow-bird, to the red-winged blackbird, and back from the blackbird to canaries seven months later.

A. A.

SERGEANT (Ed. & Et.) & CATANEI (A.). Sur un parasite nouveau du paludisme des oiseaux. [**A New Malaria Parasite of Birds.**]—*C.R. Acad. Sci.* 1928. Mar. 19. Vol. 186. No. 12. pp. 809–811. [4 refs.]

The new parasite, *Plasmodium rouxi*, here characterized and carefully differentiated, is a parasite of bird-malaria, first observed eight years ago in Algeria-bred canaries, and since maintained in constancy of character in fourteen passages from bird to bird. Its mean incubation period by direct inoculation is 21 days (extremes of 11 days and 48 days in a series of 26 cases), and the parasites multiply slowly for 3 weeks after their first appearance; but thereafter parasites may be found in the peripheral blood during the whole course of the infection, which is chronic (and apparently incurable) with irregular relapses. The infection is highly pathogenous, 15 out of 50 having been mortal; the spleen is always enlarged.

The young parasite is characterized by the constant presence of two unequal grains of pigment. As it grows it becomes elongated, but not longer than the nucleus of the infected red blood cell. Forms 2–4 μ long by 1 or 1.5 μ broad are the most numerous, and in stained preparations have a remarkable quadrangular shape; the longest forms attain about 10 μ . The schizonts produce four merozoites.

Of all known haemocytozoa of birds this extremely pathogenous species seems to be nearest akin to the non-pathogenous *P. vaughani*, parasite of the American robin (*Turdus migratorius*), described by NOVY and MACNEAL.

The authors emphasize the resemblance between its pathological phenomena and those of human malaria.

A. A.

MACFIE (J. W. S.). **A Malaria Infection of the Baboon *Papio sphinx*.**—*Proc. Roy. Soc. Med.* 1928. Jan. Vol. 21. No. 3. pp. 467–471 (Sect. Trop. Dis. & Parasit. pp. 21–25.) With 1 chart & 1 fig. [5 refs.] [London School of Hyg. & Trop. Med.]

The infection here critically described relates to a young baboon at Accra, and was under observation for five months. The heavy infection noticed at the outset was concurrent with considerable irregular fever, which subsided in a few days when the parasites became—as they afterwards continued—scanty. The parasite is described as of the *P. vivax* type, the ring forms rather large, the more advanced phases remarkably irregular and often amoeboid even to *tenue*-ty, the pigment granules light brown and fine, the gametocytes of the *vivax* type and usually larger than the red corpuscles. The parasitized corpuscles are not distinctly enlarged and not definitely stippled. No mature schizonts were found. The differences from *P. kochi* and the close resemblance to *P. inui* are indicated. Attempts to infect 2 species of Cercopithecus and a Cercopithecus by injection of blood were not successful. Infection of mosquitoes (*Anopheles*, *Mansonioides*, *Aedes argenteus*) was tried, without success.

A. A.

ANDERSON (Ch. W.) & COWDRY (E. V.). Etudes cytologiques sur le paludisme. (Premier mémoire). Etude de la "flagellation" du *Plasmodium kochi* avec le fond noir. [Study of Flagellation of *P. kochi*.]—*Arch. Inst. Pasteur de Tunis*. 1928. Mar. Vol. 17. No. 1. pp. 46–72. With 119 figs. on 4 coloured plates. [14 refs.]

A description in full and continuous detail, with 119 figures, of the process of flagellation in *Plasmodium kochi* from the Cebid monkey *Callithrix*.

A. A.

GODOY (A.) & LACORTE (J. G.). Action d'un noyau de l'oxy-amino-quinoléine sur les gamètes et les sporozoïtes de l'*Halteridium* du pigeon. [Action of Plasmochin on the Gametes and Sporozoites of *Halteridium* of the Pigeon.]—*C.R. Soc. Biol.* 1928. Mar. 2. Vol. 98. No. 8. pp. 617–619.

The conclusions of the experiments here reported are that oxy-amino-quinolein (plasmochin) destroys the gametocytes but not the schizonts of the *Halteridium* of the pigeon; it also has a destructive action on the *Halteridium* sporozoites if administered (per os) within an hour of the injection of the sporozoites into the pigeon, but not when administered 24 hours afterwards.

A. A.

NAIDU (A. Srinivasulu). **A Case of Sarcosporidiosis.**—*Lancet*. 1928. Mar. 17. pp. 549–550.

The patient, a male Hindu of 55 years, gave a history of a pustule or small abscess of 15 days, and as the result of it exhibited (over the left nipple) an irregular ulcer with undermined and indurated edges, and a fungating base perforated like a sieve, the size of the lesion being about $1\frac{1}{2}$ by 1 inch. This ulcer was duly excised, and the excised tissue was found to be invaded by sarcocysts containing multitudes of typical spores.

A. A.

JAMESON (A. Pringle). **The Action of Certain Drugs and Chemicals on *Balantidium coli* Malm. in Cultures.**—*Parasitology*. 1928. Apr. Vol. 20. No. 1. pp. 66–76. [22 refs.] [Inst. of Animal Path., Cambridge.]

The experiments described in this paper were made on cultures, and these were started from fresh-killed pigs. The drugs tested were made up either in 1 per cent. solution in distilled water and then (if necessary) diluted with Ringer and eggwhite, or directly in Ringer eggwhite. After inoculation the tubes were incubated at 37° C. for 3 days. A control tube was put up for every three, or occasionally our, drug-dilution tubes. Almost invariably several tubes of each dilution were put up at the same time. Only a few of the 26 drugs tested proved interesting. The following is the author's summary:—

"1. *In vitro* work on intestinal protozoa, employing the latest culture methods, seems to approach very closely to the normal conditions in the gut of the host.

"2. *Balantidium coli* is readily cultivated in a medium composed of an inspissated horse-serum slope covered with Ringer's solution to which egg-albumen and starch are added.

"3. Tested in this medium ipecacuanha and its alkaloids, emetine and cephaeline, show a considerable degree of toxicity.

"4. Isoemetine, methylpsychotrine and demethoxyemetine are not toxic.

"5. Arsenic compounds are not very toxic, atoxyl being the most toxic of those tried and stovarsol hardly at all toxic.

"6. Colloidal silver compounds are at best feebly toxic.

"7. Quinine is very feebly toxic.

"8. There is evidence of a distinct correspondence between *B. coli* and *E. histolytica* in their reaction to certain drugs."

A. A.

BULLETIN OF THE ANTIVENIN INSTITUTE OF AMERICA. Philadelphia, Pa. 1928. Jan. Vol. 1. No. 4. pp. 91–119.

Nearly half of this Number is filled with Mr. A. LOVERIDGE's thrilling adventures with cobras in East Africa. Mr. Loveridge has frequently encountered the black-necked cobra (*Naja nigricollis*) in action, and he confirms the statement that the reptile spits its venom from some distance, aiming at its enemy's face deliberately and with accuracy so nice that the spray gets into his eyes. The resulting conjunctivitis heals in a few days if properly treated. Mr. D. D. H. MARCH discourses familiarly on the fer-de-lance (*Lachesis atrox*) as encountered in Honduras. Mr. G. E. COLEMAN gives some account of a reputed antidote of the Hopi Indians to rattlesnake venom—a secret herbal antidote, which is applied locally and also taken internally; his own experiments show that it did "not protect guineapigs against

small amounts of rattlesnake venom." Do AMARAL describes his plan of removing venom from a snake without damaging the reptile's mouth. He also gives some figures of the average amounts of venom yielded at one action by different species of American pit-vipers, and of the ratio between the solids and the liquids of the venom.

A. A.

BULLETIN OF THE ANTIVENIN INSTITUTE OF AMERICA. Philadelphia, Pa. 1928. Apr. Vol. 2. No. 1. pp. 1-24.

An interesting item is Mr. W. H. OVER's account of his own sufferings from snake-bite. The snake was a rattlesnake, *Crotalus confluentus*, that had been in captivity $5\frac{1}{4}$ years, the victim was 57 years old, and the wound was inflicted by one fang, which was driven into the second joint of the left index finger. A ligature [which could have been of little use] was immediately applied to the finger, and a minute later the wound was incised, sucked, and treated with strong solutions of KMnO_4 . Except for a hypodermic injection of morphine 3 hours after the infliction of the wound, there was no further treatment.

The victim describes the instantaneous pain shooting up the arm, the dizziness and faintness, and the peculiar creepy sensation over the whole body which occurred when, in half an hour, the ligature was removed. About half an hour after that vomiting occurred and a stupendous evacuation from the bowel, and there was much nervous distress subsequently. In 3 hours time an insatiable thirst started, and resisted all allaying efforts for 36 hours. The swelling is described. It began about an hour after the infliction of the wound, in 36 hours the whole arm was swollen seemingly to its utmost capacity, and it then extended to the left side as far as the waist. Intense pain and itching accompanied the swelling, which was suffused with blood like a bruise. The swelling began to subside in ten days, but had not disappeared entirely at the end of two weeks. The pain, which at first interfered with sleep, persisted after the swelling had gone. Four weeks after the accident the wounded finger was still swollen and stiff, and then it was discovered that a fang was imbedded in the flesh. Although the patient made a good recovery the finger was still stiff and painful a year afterwards.

Mr. A. LOVERIDGE contributes a stirring paper on the vipers of East Africa—*Bitis*, *Causus*, *Atheris*, and *Atractaspis*. *Bitis arietans*, the puff adder, which appears to be a notorious trespasser into houses, is fortunately not aggressive, although sullenly indisposed to budge when disturbed. The author tells of a bite inflicted on himself by this snake. Only one fang penetrated and immediate treatment with ligature and strong solution of KMnO_4 was effective. This species is said to be mistaken for a comparatively harmless python sometimes. The remarkably bright carpet-like colouring of *Bitis gabonica* and *naicornis* is said to have the paradoxical effect of making these species inconspicuous. The very common *Causus rhombeatus* is given a bad character, being both voracious and viciously aggressive. The tree-vipers of the genus *Atheris* also are called vicious. The burrowing vipers of the genus *Atractaspis* are said to be active and aggressive when they are brought to the surface by rain. Mr. L. M. KLAUBER has a paper on the manipulation of rattlesnakes for the collection of their venom, and there are also three papers on taxonomic herpetology.

A. A.

DE ASSUMPTÃO (Lucas). O Instituto de Butantan na luta contra o ophidismo. Alto efficacia dos seus soros anti-peçonhentos. [**The Efficacy of Anti-Venin prepared at the Butantan Institute.**—*Brasil-Médico*. 1928. May 5. Vol. 42. No. 18. pp. 480-491. With 3 charts in text.

The Institute was first opened for the preparation of plague vaccine in 1899. In 1901 the manufacture of antivenin was started. More than 10,000 poisonous snakes on an average have been received yearly of late.

Two antivenins are made: a monovalent anti-crotaline and a polyvalent for *Crotalus* and some half-dozen species of *Lachesis*. The results of employment of these have been remarkably good. Between 1902 and 1927 one statistical account gives 101 deaths out of 3,138 individuals (including animals) bitten, a mortality of only 3·2 per cent. Death was in almost all instances ascribable to delay in initiating treatment. [In another table the total number of cases is stated to be 3,131, of which 116 died, giving a mortality of 3·7 per cent.] Most of the bites were by *L. lanceolatus*, 1,179 cases, next in order being by *Crotalus terrificus*, 432 cases. Excluding animals and dealing solely with human cases, the mortality rate was only 2·5 per cent.

The dosage recommended is as follows: Between one and two hours after the accident 1-2 ampoules of serum; between two and four hours 3-4 ampoules; between four and eight hours 4-6 ampoules.

[The figures given in the above abstract are as accurate as could be worked out from the text. An element of uncertainty arises from the fact that the figures in the text and those in the tables are not always in agreement.]

H. Harold Scott.

BRAZIL (Vital) & VELLARD (J.). Action coagulante et anticoagulante des venins. [**Coagulating and Anticoagulating Action of Venoms.**]—*Ann. Inst. Pasteur*. 1928. Apr. Vol. 42. No. 4. pp. 403-451. With 2 text figs. [38 refs.]

Dissimilar methods and conditions of study have led to notoriously discordant conclusions respecting the action of specific snake-venoms upon the clotting of the blood; employing a settled technique under uniform *in vitro* conditions the authors expect more consistent results. Their range of study includes 16 species of Crotalines (4 *Crotalus*, 9 American and 1 Asiatic *Lachesis*, and 2 American *Ancistrodon*); 1 Viperine (*Vipera russellii*); 6 proteroglyph Colubrids (4 Elaps, *Naja tripudians*, and *Notechis scutatus*); 1 opisthoglyph Colubrid (*Philodryas schottii*); 2 toads (*Bufo marinus* and *paracnemis*); 3 spiders (*Ctenus nigriventer*, *Lycosa raptoria*, and *Nephila clavipes*), 2 scorpions (*Tityus bahiensis* and *Bothriurus vittatus*) and a wasp of the genus *Polistes*.

Of all the 24 snake-venoms specified above, that of *Naja tripudians* (Indian cobra) alone inhibits coagulation and has no proteolytic action. All the others are coagulant in different degree, and those of *Crotalus*, *Lachesis*, and *Ancistrodon* have also a proteolytic (anticoagulant) property, it being possible to dissociate the coagulant and the proteolytic properties by heat. The resistance of the coagulant property to heat is variable; in some species it is lost altogether at 80°. [? C.], in others it is only slightly impaired after 15 minutes exposure to

100° [? C.]. There is no parallelism between coagulant power and toxic virulence. Some of the venoms in doses below the minimum coagulant dose stimulate the normal clotting of the blood; others do not.

The venoms of the two species of *Bufo* slightly inhibit coagulation. Those of the spiders and of *Polistes* are inactive; those of the scorpions are feebly coagulant.

The action of a given venom upon the plasma of different kinds of animals is very variable; certain venoms (e.g., *Lachesis jararacucu*) that are extremely coagulant for the plasma of cold-blooded animals have little effect on mammalian plasma; other venoms extremely coagulant for mammalia have almost no effect upon the plasma of oviparous vertebrates.

A. A.

PHISALIX. Pouvoir rabicide *in vitro* du venin de vipère aspic. [**Rabidical Power in Vitro of the Venom of *Vipera aspis*.**—*C.R. Acad. Sci.* 1928. Mar. 19. Vol. 186. No. 12. pp. 795-797. [4 refs.]

The author has previously shown that the rabbit immunized (by repeated doses) to the venom of *Vipera aspis* (and also to the mucous venom of certain batrachians) becomes protected against the fixed virus of rabies; and CALMETTE has also shown that the venom of the Cobra possesses the same "rabicide" property. In both cases the blood of the animal immunized to the venom becomes antirabic. In the present paper the author shows that the venom of the viper (*V. aspis*) retains its "rabicide" power *in vitro* even after its toxic power has been destroyed by heat. The antirabic power is thus something quite distinct.

A. A.

PHISALIX (M.) & PASTEUR (F.). Action des rayons ultra-violet sur le venin de vipère aspic. [**Action of Ultra-Violet Rays on the Venom of *Vipera aspis*.**—*C.R. Acad. Sci.* 1928. Feb. 20. Vol. 186. No. 8. pp. 538-540.

Submitting solutions of dried and well preserved venom of *Vipera aspis* to the action of the ultra-violet rays the authors found that the virulence of the venom was in no case diminished thereby, but in certain cases was rather increased. The only constituent of the venom that was destroyed by the rays was the echidno-vaccin upon which the production of immunity depends.

A. A.

PHISALIX (M.) & PASTEUR (F.). Les rayons ultra-violet détruisent le pouvoir rabicide du venin de la vipère aspic (*Vipera aspis* L.). [**Destruction by Ultra-Violet Rays of Rabidical Power of Venom of *V. aspis*.**—*C.R. Acad. Sci.* 1928. Apr. 2. Vol. 186. No. 14. pp. 975-977. [2 refs.]

Although heating to 100° C. destroys the toxic and the anti-venomous properties of viper venom, it has no such effect upon its antirabic power. Exposure to ultra-violet rays, however, destroys, as is here shown, also the antirabic power of that venom. In other words ultra-violet irradiation has an elective destructive effect on the distinct antigens that condition the antivenomous and antirabic powers.

A. A.

PHISALIX (M.). Indépendance des propriétés antirabiques et antivenimeuses du sang des couleuvres aglyphes appartenant au genre *Coluber* Lin. [Antirabic and Antivenom Properties of the Blood of Aglyph Colubrids.]—*Bull. Soc. Path. Exot.* 1927. Dec. 14. Vol. 20. No. 10. pp. 986-988.

—. Propriétés du sérum des couleuvres aglyphes appartenant au genre *Coluber* Lin.—*C.R. Acad. Sci.* 1927. Dec. 19. Vol. 185. No. 25. pp. 1536-1538. [1 ref.]

In a former paper (*C.R. Acad. Sci.*, 1926, Vol. 182, p. 499) the author showed that the toxic serum of certain aglyph Colubrid snakes, namely, *Coluber natrix* and *viperinus* (serum that becomes antivenomous by appropriate heating) manifests—like the serum of the viper—strongly antirabic properties *in vitro*. In the present papers she describes experiments with two other aglyph Colubrids—*Coluber aesculapii* and *scalaris*—showing that *in vitro* the heated serum of *C. aesculapii* has antivenomous properties equal to that of the viper and antirabic properties much less than that of the viper, while that of *C. scalaris* neutralizes viper venom both *in vitro* and *in vivo*, but has no antirabic property at all.

A. A.

PICADO (C.). Traitement diastasique de l'envenimation cobraïque expérimentale. [Diastasic Treatment of Experimental Cobra Poisoning.]—*C.R. Soc. Biol.* 1928. Apr. 27. Vol. 98. No. 13. pp. 1130-1131. [1 ref.] [San José Hosp., Costa Rica.]

This is rather an academic subject. Prolonged contact with trypsin destroys snake (cobra) venom, and eosin by precipitating the venom gives the trypsin time to convert the venom into a substance the toxicity of which can be neutralized by sulphate of spartein. The author wonders whether this series of reactions could be usefully applied to treatment of snake-bite in the absence of antivenine.

A.

STEWART (A. D.). A Note on Stability of Solutions of Calcium Hypochlorite intended for Use in Snake Bite.—*Indian Med. Gaz.* 1928. Feb. Vol. 63. No. 2. pp. 76-77.

For immediate local treatment of snake-bite CALMETTE'S classical method is by injections of a 2 per cent. solution of calcium-hypochlorite—a solution that has the credit of being innocuous to the tissues. Experiments recorded in the present paper show that such solutions if kept in store for general issue for emergencies, must be sealed in amber-coloured ampoules and kept in the dark in a cool room (about 70° F.); under these conditions a solution of approximately 2 per cent. available chlorine had lost only about 5.5 per cent. of its original strength at the end of a year. A similar solution similarly sealed and simply kept in the laboratory had lost more than half its strength, and a similar solution—and even a stronger solution—sealed in colourless ampoules and kept in the laboratory had lost all their original strength at the end of a year. In fact, the solutions kept in colourless ampoules, even when they were fortified with a small amount of alkali, had lost from three-fourths to four-fifths of their strength at the end of three months.

A. A.

YARROW (Henry Crecy). Recurrence of Symptoms after Snake Bite.—*Milit. Surgeon.* 1928. Jan. Vol. 62. No. 1. pp. 73-76.

The author, whose views, at least, on the treatment of snake venom, are not those now current, quotes four cases, reported and published

respectively in 1843, 1860, 1872-73, and 1875, where "poisonous symptoms" recurred, in the first case, annually for 18 years, in the second at 27 years, in the third case yearly, and in the fourth case periodically for more than 6 years, after the infliction of a snake-bite. In the first and third cases the snake was *Ancistrodon piscivorus*, in the second case, *A. contortrix*, and in the fourth case an unspecified rattlesnake.

A. A.

MYLREA (C. Stanley G.). **A Case of Snake Bite in Kuwait, Arabia.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1928. Feb. 25. Vol. 21. No. 5. p. 426.

The patient in this case was suffering pain and shock and incessant vomiting when seen 9 hours after being bitten. Marks between toes on the *right* foot were indicated as caused by the snake's teeth. The *left* arm and leg were observed to be limp and the eyelid on the same side to be drooping, and within 24 hours of the accident that arm and leg were completely paralysed. Within a few days the paralysis began to clear up, but the ptosis was slightly evident a month afterwards, when the patient left hospital [Unfortunately, nothing was afterwards seen of the snake, which was said to be "a small brown creature."]

A. A.

WADE (H. W.). **Post-Mortem Findings in Acute Jelly-Fish Poisoning with Sudden Death in Status Lymphaticus.**—*Amer. Jl. Trop. Med.* 1928. May. Vol. 8. No. 3. pp. 233-241. [8 refs.]

In addition to good documenting there is here a useful summary of recorded and characteristic symptoms of medusa-sting—pain, respiratory embarrassment, restlessness (often hysterical), shock—and a note of two Indopacific species of medusae, namely, *Chiropsalmus quadrigatus* [one of the Cubomedusae, with thick quadrangular umbrella and 4 marginal tentacles] and *Dactylometra quinquecirrha* [one of the Scyphomedusae, with thin discoid umbrella having numerous marginal lobes], both of which have a bad character.

The patient in the present case was a strong young male Filipino working waist-deep in a mangrove swamp. He suddenly called out that something had bitten his leg. One of his mates reached him quickly, just as he was collapsing, and by the time he had been laid on a raft (about two minutes) he was dead. It was thought that he had been bitten by a sea-snake, but a band of livid discolouration round one knee and spreading weals on the leg below could be attributed only to the tentacles of a jellyfish. At the post-mortem examination, apart from "definite evidence of status lymphaticus" (which is believed to explain the overwhelming suddenness of the fatality) and slight evidence of leprosy, the striking features were acute congestion of the viscera, serous oedema of lungs (with diapedesis) and acute toxic nephritis (with diapedesis)—the state of the kidneys probably explaining the lumbar pain that has characterized certain accidents with jellyfish.*

* It should be noted that Sir George NEWMAN (On the State of the Public Health. Annual Report of the Chief Medical Officer of the Ministry of Health for the Year 1926. H.M.S.O.) after a discussion of recent work on the thymus and status lymphaticus, writes—"The conclusion to which we must come is, I believe, that *status lymphaticus* of our death registers and inquisitions is a mere verbalism and the current text-book teaching erroneous." See also GREENWOOD and WOODS, *Journal of Hygiene*, 1927, Vol. 26, p. 305.—ED.

In a postscript is a short hearsay account from a District Health Officer of another sudden death following the stings of a jellyfish—a man in a bathing party, about 110 yards from shore, showing sudden signs of distressed breathing, and being dead by the time he was brought to land by his mates.

A. A.

HOFFMANN (W. H.). *La Ciguatera, die Fischvergiftung von Cuba. [Ciguatera, the Cuban Fish-Poison.]—Abhandl. a. d. Gebiet d. Auslandskunde. Hamburg. Univ. 1927. Vol. 26. (D., Med. & Vet. Vol. 2.) [Festschrift NOCHT.] pp. 197–200. [Finlay Lab., Health Ministry, Harvard.]*

With respect to the poisoning by fish known in Cuba as Ciguatera, the author calls to mind the distinction between fish that become poisonous when tainted (as may happen very quickly in the tropics), and fishes that are truly toxic either in their own tissues or organs, or by feeding on poisonous food. He states that there are distinguished physicians in Cuba who still think that Ciguatera is due to eating fish that has become tainted. The object of the paper seems to be to call attention, in the interests of the important and developing fishing industry of Cuba, to an exact study of a subject which at present is in confusion. The paper contains a list of fishes that are entirely prohibited in Cuba markets and another list of such as are prohibited only when full-grown or over a certain weight. [Neither of them, of course, attempting to distinguish between the species that are truly toxic and the species that are dangerous because liable to become tainted.]

A. A.

LEBER (A.). *Ueber Tetrodonvergiftung. [On Poisoning by Tetrodon.]—Abhandl. a. d. Gebiet d. Auslandskunde. Hamburg. Univ. 1927. Vol. 26. (D., Med. & Vet. Vol. 2.) [Festschrift NOCHT.] pp. 641–643. With 6 figs. on 2 plates.*

This is an account of a case of poisoning from eating globe-fish (species of *Tetrodon*).

The patient was a native of Amboina, in the Netherlands East Indies, about 30 years of age, and he was seen about 3 hours after the meal of globe-fish and rice. He was weary and languid from furious vomiting; the skin was suffused and somewhat swollen, and the conjunctiva injected; the pulse and respiration were quickened, and the temperature was 38° C. (and continued between 39° and 40° C. during the next day, when his condition was still serious). Albumin, urobilin, red blood corpuscles and casts were observed in the urine, and the evacuations were slimy and sanguineous. The suffusion of the skin was soon followed by general oedema, some subcutaneous haemorrhages about the elbows and knees and shins and the sides of the chest, and a general eruption of petechiae. On the 3rd day desquamation began, with some vesiculation; the palms of the hands were still swollen, and the temperature was subnormal. On the 6th day there was still some blood to be seen in the stools, and the signs of nephritis were less obvious. On the 9th day desquamation was still proceeding and albumen could still be demonstrated in the urine; but the patient was fairly recovered.

After the evacuation of the contents of the stomach and gut the treatment was directed to stimulation of the vasomotor control by injections of caffein and to checking haemolysis and diapedesis by calcium and other astringents.

A. A.

KATAGI (Ryuzo). Der Einfluss einiger erregender Gifte auf die Wirkung des Tetrodotoxins am Skelettmuskel. [**The Influence of Certain Stimulant Drugs upon the Action of Tetrodotoxin on Skeletal Muscle.**—*Okayama-Igakkai Zasshi (Zent. d. Okayama Med. Gesellsch.)*. 1927. Nov. Vol. 39. No. 11. (No. 454). German summary p. 1880. [In Japanese pp. 1869–1879. With 8 text figs. 17 refs.] Pharm. Inst., Univ., Okayama.]

Tetrodotoxin, from the ovary of Tetrodontidae (Globe-fish, Parrot-fish), besides its curari-like action upon the nerve-endings of the voluntary muscles, has been said also to paralyse the respiratory and vascular centres. According to the author's observations its secondary action is upon the muscle itself, and the best antidotes to this particular action are caffein, camphor, and strophanthin, especially the two first.

A. A.

CAWSTON (F. G.). **The Molluscan Hosts for the Bilharzia Parasites in Africa.**—*Kenya & East African Med. Jl.* 1928. Mar. Vol. 4. No. 12. pp. 390–391.

The species of mollusca favoured by the Bilharzia parasites of man in Egypt are of the genus *Bulinus*, and further south usually *Physopsis*—in Central Africa *Physopsis globosa*, an allied species in Zanzibar, and *Physopsis africana* in South Africa. The problem of identifying the molluscan host is complicated, since not only are the shells of the different species of *Physopsis* much alike, but also there are 4 species of Bilharzia that attack man, although two of them, probably, only accidentally since they possibly are parasites of goats and oxen. The author thinks that a careful description of the anatomy of the animal that secretes the *Physopsis* shells would be useful.

A. A.

BEQUAERT (J.). **Mollusks of Importance in Human and Veterinary Medicine. Parts I and II.**—*Amer. Jl. Trop. Med.* 1928. Mar. & May. Vol. 8. Nos. 2 & 3. pp. 165–182; 215–232. [91 refs.]

This is a conspectus of medical malacology. In the first section are enumerated and severally discussed the liver flukes, intestinal flukes, lung-flukes, and blood flukes pathogenous to man and his domestic animals (and also the *Davainea* tapeworm of the fowl), the flat-worms whose life-cycle is known to require the intermediation of a molluscan host. The second section deals with the classification and distinctive characters of the various molluscan intermediaries, taking into consideration not only the several families of land-snails, slugs, and aquatic (and amphibious) snails that supply specific hosts, but also including certain genera and families (*Physa*, the Apple-snails, and the

Viviparidae) which the medical malacologist should be able to recognize for other good reasons. The third and final section is devoted to prophylactic measures against the molluscan intermediaries—drainage, chemicals (quicklime, copper sulphate, ammonium sulphate, "lime nitrogen," calcium cyanide), natural enemies (domestic ducks, appropriate fishes, larvae of fire-flies which live largely on snails, all of which are critically discussed.

A. A.

HALL (E. Raymond). **An Outbreak of House Mice in Kern County, California.**—*Univ. California Public. Zool.* 1927. Feb. 21. Vol. 30. No. 7. pp. 189–203. [2 refs.]

This "outbreak" of mice (*Mus musculus* was the actual species) occurred in the winter of 1926–27 in the country around Buenavista Lake in California. The lake had then been dry for three years, for the last two of which its bed (an area of 35 square miles) had been extensively cropped with barley and other corn. The fallen grain and the stubble had supplied food and shelter for a healthy increase in the number of small rodent inhabitants of the area, and this increase had been unbounded because in 1924–25 the small carnivora that naturally keep rodents in check had been poisoned off by the local farmers. In the fall of 1926 sheep were put in to graze over the area and so destroyed the paradise of the mice, and the "wee sleekit cow'rin tim'rous beasties" thus dispossessed of their heritage revealed their enormous strength in an enforced migration into the surrounding country. The numbers seen and killed put the rats of the pied piper of Hamel into the shade; they "were to be reckoned in tens, possibly hundreds, of millions"; in one barn, on one estate, in one day approximately two tons of mice were sifted out of the grain; at the source of migration the author calculated the number to be 82,280 per acre.

[Those who in these days of hustle can find time for Darwin's *Origin of Species* will find in this story an excellent illustration of the argument of Chapter III of that immortal work.]

A. A.

BARRAUD (P. J.). A Revision of the Culicine Mosquitoes of India. Part XXIII. The Genus *Aedes* (sens. lat.) and the Classification of the Subgenera. Descriptions of the Indian Species of *Aedes* (*Aedimorphus*), *Aedes* (*Ochlerotatus*), and *Aedes* (*Banksinella*), with Notes on *Aedes* (*Stegomyia*) *vasegatus*.—*Indian Jl. Med. Res.* 1928. Jan. Vol. 15. No. 3. pp. 653–670. With 40 figs. on 4 plates. [10 refs.]

EYSSEL (Adolf). Beiträge zur Lebensgeschichte von *Aedes argenteus*, der Gelbfiebermücke.—*Abhandl. u. d. Gebiet d. Auslandskunde Hamburg. Univ.* 1927. Vol. 26. (D., Med. & Vet. Vol. 2.) [Festschrift NOCHT.] pp. 638–640.

HINSHAW (H. Corwin). Cultivation of *Trichomonas buccalis*, a Protozoan of the Human Mouth.—*Univ. California Public Zool.* 1927. Oct. 4. Vol. 31. No. 4. pp. 31–49. [13 refs.]

KESSEL (John F.). Methods of Preparing Intestinal Protozoa for Study.—*China Med. Jl.* 1927. Dec. Vol. 41: No. 12. pp. 1030–1032.

KOCH (Dorothy Ann). Relation of Moisture and Temperature to the Viability of *Endamoeba gingivalis* (Gros) in Vitro.—*Univ. California Public. Zool.* 1927. Sept. 3. Vol. 31. No. 3. pp. 17–29. With 2 text figs. [11 refs.]

- LARROUSSE (F.). Présence du *Phlebotomus ingrami* Newst., à Entebbé (Uganda).—*Ann. Parasit. Humaine et Comparée*. 1928. Apr. 1. Vol. 6. No. 2. pp. 203-205. With 2 text figs. [9 refs.] [Inst. of Hyg. & Bact., Strasbourg.]
- LEGENDRE (J.). L'attaque et la défense contre les moustiques.—*Presse Méd.* 1928. Mar. 3. Vol. 36. No. 18. p. 285-286. With 2 text figs. [12 refs.]
- MARTINI (E.). Ueber Wolgamücken und Wolgamalaria.—*Verhandlungen der Internationalen Vereinigung für theoretische und angewandte Limnologie*. Vol. 3. pp. 282-290.
- PRADO (Alcides). Notas sobre os anophelineos do estado de São Paulo. (Notes on the Anophelines observed in the State of S. Paulo).—*Rev. Biologia e Hyg.* São Paulo. 1927. Vol. 1. No. 2. pp. 87-89. English summary p. 89. [4 refs.] [Inst. of Hyg., S. Paulo, Brazil.]
- SHAKHOV (S.). *Anopheles plumbeus* Hal. in Ukraine.—*Rev. Microbiol. et Épidémiol.* 1928. Jan. Vol. 7. No. 1. English summary p. 137. [In Russian pp. 23-34. With 12 text figs. Refs in footnotes.] Occurrence of this species in Ukraine is noticed.
- ZSCHUCKE. Ein Beitrag zur Frage der Stechmückenbekämpfung.—*Abhandl. a.d. Gebiet d. Auslandskunde Hamburg. Univ.* 1927. Vol. 26. (D., Med. & Vet. Vol. 2.). [Festschrift NOCHT.] pp. 631-637. [1 ref.] [Bact. Inst., Anhalt District, Dessau]

TROPICAL MYCOLOGY.

PROCEEDINGS OF THE ROYAL SOCIETY OF MEDICINE. 1928. May. Vol. 21. No. 7. pp. 1285-1305 (Sect. of Trop. Dis., Dermat. & Comp. Therap. pp. 113-133.) With 10 figs. [16 refs.]—**Discussion on Tropical Mycoses.** [MACLEOD (J. M. H.), RAMSBOTTOM (J.), WHITFIELD (Arthur), MANSON-BAHR (P. H.), GASKELL (A.) & DOWLING (G. B.).] Les épidermomycoses [LANGERON (M.).]

The main point which arises from this discussion is the urgent need for a satisfactory botanical classification of pathogenic fungi, which would permit of the rapid and certain identification of these fungi. Unfortunately, the "medical" or "clinical" classifications have become so firmly established that their replacement by botanical classifications is very difficult, although the similarity of lesions produced by widely different fungi, and the varying types of lesions produced by the same fungus, render clinical classifications of mycoses very unsatisfactory. Nevertheless, VUILLEMIN, OTA & LANGERON and others, have made considerable progress in the direction of sound classification of pathogenic fungi, although their schemes are not so far generally used owing to the trouble and time involved in making the cultural studies which are necessary in order to determine the systematic position of a fungus in these systems.

Langeron's article is a general account of epidermomycoses, or cutaneous mycoses which involve the dermis and may or may not result in more or less deep ulceration. He briefly describes the different clinical types and gives lists of the various fungi which have been isolated from them. In many cases the pathogenicity of the fungi obtained is not at all certain.

P. Tate.

DURANTE (G.). Les mycoses méconnues. [**Unrecognized Mycoses.**]—*Bull. et Mém. Soc. Méd. Hôpit. de Paris.* 1927. Nov. 17. Year 43. 3rd Ser. Vol. 51. No. 32. pp. 1513-1516.

The author considers that mycotic diseases are much more common and varied than is generally thought. He has observed the following cases. (1) In the kidney of a woman who died of eclampsia, staining with gram revealed the presence of long hyphae in the neighbourhood of the vessels. These hyphae did not provoke any reaction in the surrounding tissue. (2) Branched hyphae were found in the appendix of a young girl whose condition was doubtfully diagnosed as appendicitis. (3) Before confinement a woman had a temperature of 37.8-38.2° which persisted for five days after confinement, when she left the hospital in apparently perfect health. Twelve days later she returned in coma, died, and at the autopsy there was no sign of purpural infection and no bacteria in the mucosa of the uterus, but numerous fungous cells, 4-5 μ in diameter, were present in some vessels of the uterus and were especially numerous in the capillaries of the lungs. (4) After much difficulty branched hyphae with dumb-bell shaped spores were revealed in a tumour of the thigh, diagnosed as a sarcoma. (5) Mycelium and spores of a similar nature were found in an osteo-sarcoma of the leg.

P. T.

TÁLICE (Rodolfo V.). Actinomicosis en el Uruguay. [**Actinomycosis in Uruguay.**—*Bol. Inst. Clin. Quirurg.* Buenos Aires. 1927. Vol. 3. Nos. 21–25. pp. 819–824. With 8 text figs. & 3 coloured figs. on 1 plate. [7 refs.] [Also issued as *3a Reunión, Soc. Argentina Patol. Regional del Norte, Tucumán, Julio, 7, 8 y 10, 1927.* pp. 711–716 & illustrations.]

The literature on the parasitic fungi in Uruguay is very meagre. Actinomycosis in animals, states the author, is not uncommon. Statistics published for Monte Video between 1900 and 1906 showed one in every 592 cows, with the disease localized in the udder, and in the slaughter-houses one in every 3,889, the head being the chief site. The first human case was recorded by DEMICHERI in 1899; the disease was conjunctival and was cured by extirpation. During the next 7 years two more were seen; one had the tongue affected, the other the lower lip. Since then, cases have been reported by ALGORTA and SCALTRITTI (cervico-facial) in 1907, by DEVINCENZI (gluteal) in 1908, by NACIO (caecal) and QUINTELA E., seven cases (muco-cutaneous) in 1924; three have been recorded since these, all with head lesions.

A coloured plate gives excellent reproductions of the histological changes.

H. Harold Scott.

MONTPELLIER (J.), CATANEI (A.) & COLONIEU (L.). Sur un cas d'actinomyose de la face observé à Alger. [**A Case of Actinomycosis of the Face in Algiers.**—*Bull. Soc. Path. Exot.* 1928. Mar. 14. Vol. 21. No. 3. pp. 197–200. [6 refs.] [Path. Anat. Lab., Faculty of Med., & Pasteur Inst., Algiers.]

A species of Microsiphonales possessing the principal characters of *Cohnistreptothrix israeli* (Kruse 1896) was obtained from a case of actinomycosis of the face in a native woman aged 16. Actinomycosis is rare in both man and animals in Algiers.

P. T.

LEÃO (A. E. de Arêa). L'intradermo-réaction dans l'actinomyose. Réaction spécifique de la peau avec le filtrat de culture d'*Actinomyces bovis*. [**Intradermal Reaction in Actinomycosis. Specific Skin Reaction with Filtrate from Culture of Actinomyces bovis.**—*C.R. Soc. Biol.* 1928. May 25. Vol. 98. No. 17. pp. 1575–1576.]

An intradermal reaction, similar to the reaction obtained with tuberculin in tuberculous subjects, resulted from the injection of 0.3 cc. of a filtrate from a culture of *A. bovis* Harz 1877, in the arm of two cases of actinomycotic mycetoma. The culture used for the filtrate was grown on ordinary broth pH 7.4 at 37° C. for 18 months, and then filtered through candles. The other arm of the patients was injected with the same amount of broth similar to that used for the culture, but no reaction was given. The reaction provoked by the filtrate reached its maximum at the end of 24 hours, persisted for 3 days, and then decreased and disappeared. Injection of the filtrate into 4 normal subjects did not provoke any reaction.

P. T.

CELIDONIO (Caio). Um caso de mycetoma primitivo do seio. [**Primary Mycetoma of the Breast.**].—*Brasil-Médico*. 1928. May 5. Vol. 42. No. 18. pp. 491–493. With 4 text figs.

The patient, a woman of 34 years, presented herself with a swelling in the right breast which had grown rapidly. No history of any injury was obtained. Sporotrichosis was diagnosed and total extirpation performed. Section showed the breast to contain small abscesses with connective tissue septa and granulomatous nodules containing pink granules.

Cultivation was successful on Sabouraud's medium and the culture has been sent away for identification, but at the time of writing the author had not received a reply. The patient left hospital, apparently quite cured, 15 days after the operation.

H. Harold Scott.

DA FONSECA (O.) & LEÃO (A. E. de Arêa). Sur un cas d'acladiose à *Acladium castellanii* observé au Brésil. [**A Case of Acladiosis in Brazil.**].—*C.R. Soc. Biol.* 1927. Nov. 18. Vol. 97. No. 31. pp. 1361–1362. [Oswaldo Cruz Inst. & Dermat. Clinic, Faculty of Med., Rio de Janeiro.]

Cultures of *Acladium castellanii* were obtained from ulcerous skin lesions of the jaw and pre-sternal region of a Portuguese rag-dealer, aged 40 years.

P. T.

TORRES (G. Magarinos). Histologie pathologique de l'acladiose. [**Pathological Histology of Acladiosis.**].—*C.R. Soc. Biol.* 1927. Nov. 18. Vol. 97. No. 31. pp. 1362–1364. [Oswaldo Cruz Inst., Rio de Janeiro.]

The portion of tissue examined was from a lesion on the face of FONSECA and LEÃO's case of acladiosis [see this *Bulletin* above]. There was mild inflammation in the destroyed regions of the epidermis; and a chronic inflammation of the dermis, more intense in the region of the papillae, in which, in addition to giant cells, isolated and in groups, there was a more or less diffuse infiltration with endothelial leucocytes. The lesions differ from tuberculous lesions in that the giant cells are not of the Langhans type, and nearly always may be seen to arise by the fusion of endothelial leucocytes; and in that there is never necrosis nor caseation.

P. T.

DE MAGALHÃES (Octavio) & NEVES (Aroeira). [In Portuguese & French]. Contribuição ao estudo das Tinhas. *Trichophyton multicolor* n. sp. Contribution à l'étude des Teignes. *Trichophyton multicolor* n. sp. **Contribution to the Study of Ringworms.** *Trichophyton multicolor* n. sp.—*Mem. Inst. Oswaldo Cruz* 1927. Vol. 20. No. 2. In Portuguese pp. 271–284. With 12 plates (2 coloured) [6 refs.] In French pp. 285–298. [Oswaldo Cruz Inst., Rio de Janeiro.]

The fungus was isolated from a ringworm patch on the scalp of a child, aged 10 years. Flask cultures on Sabouraud's maltose agar attain their maximum development in about 25 days and have a folded and convoluted, powdery surface. The central part is elevated and deep yellow, and is surrounded by a wine red zone, then by a clear yellow zone, and, finally, by a pure white peripheral border. White pleomorphic tufts appear about the 21st day. In culture it develops simple or compound bunches of sessile or pedicellate aleuries; terminal and intercalary chlamydospores; and, later, spiral hyphae and spindle-shaped chlamydospores.

It is easily inoculable to man and guinea pig by scarification and behaves as an "endo-ectothrix."

The authors consider it to be a new species of *Trichophyton* belonging to the neo-endothrix group of Sabouraud, and name it *T. multicolor*.

P. T.

MARTINS (César). *Microsporum lanosum* et trois espèces cryptogamiques satellites isolées dans un cas de teigne tondante. [*Microsporum lanosum* and Three Allied Species isolated from a Case of Tinea Ton-surans.]—*C.R. Soc. Biol.* 1928. Apr. 27. Vol. 98. No. 13. pp. 1164-1166. [Bact. Lab., Faculty of Med., Oporto.]

Cultures were obtained from the scalp of a child and from hairs of a dog with which the child had played. The fungus is probably *Microsporum lanosum*, although it differs slightly in cultural characters and in the clinical aspect from Sabouraud's description. Three types of cultures were obtained which retained their differential characters throughout development, but the author is uncertain whether to regard them as distinct species or as different pleomorphic forms of *M. lanosum*.

P. T.

DE CASTRO (Abilio Martins). *Epidermophyton Rubrum*, Cast. Contribuição para o seu estudo clinico, experimental e parasitológico. [Clinical, Experimental and Parasitological Study of *Epidermophyton rubrum*.]—*Ann. da Faculdade de Med. de S. Paulo.* 1927. Vol. 2. pp. 441-474. With 34 figs. on 21 plates. French summary pp. 474-475. [10 refs.] [Dermat. & Syph. Clinic, Faculty of Med., S. Paulo, Brazil.]

Epidermophyton rubrum was isolated 6 times out of a total of 180 cases of dermatomycoses in S. Paulo. It was generally localized in the natural folds of the skin, but was once found attacking the finger nails. It was never seen to invade the hair either in human cases or in experimental infections of guinea pigs. The lesions in man have a chronic evolution, may invade large areas, and generally take the form of "Eczema marginatum" of Hebra.

P. T.

MARTINS (César). *Malassezia furfur* observé dans un cas de pityriasis versicolor. [*Malassezia furfur* in a Case of Pityriasis Versicolor.]—*C.R. Soc. Biol.* 1928. Apr. 27. Vol. 98. No. 13. pp. 1166-1167. [Bact. Lab., Faculty of Med., Oporto.]

In scales from a case of pityriasis versicolor abundant yeast-like cells and mycelial fragments were found; and, although cultures were not successful, the data are considered to be sufficient to justify the identification of the fungus as *Malassezia furfur*.

P. T.

CASTELLANI (Aldo). Notes on Blastomycosis: its Aetiology and Clinical Varieties.—*Proc. Roy. Soc. Med.* 1928. Jan. Vol. 21. No. 3. pp. 447-461 (Sect. Trop. Dis. & Parasit. pp. 1-15). With 10 text figs. [Ross Inst., London, & Tulane Univ. of New Orleans, U.S.A.]

The pathogenic yeast-like fungi are distributed in the genera *Saccharomyces*, *Cryptococcus*, *Endomyces*, *Monilia*, and *Blastomycoides*; and the various blastomycoses which they cause are divided into the

types Blastomycosis verrucosa, ulcerativa profunda, purulenta profunda, glutealis, and furunculosa. Under these headings, short descriptions of the diseases and the causative fungi are given, together with brief descriptions of illustrative cases, particulars of which have been published in detail elsewhere.

P. T.

DA FONSECA, Filho (Olympio) & LEÃO (A. E. de Arêa). [In Portuguese & English.] Diagnostico diferencial entre as formas brasileiras de blastomycose. **The Differential Diagnosis between the Brazilian Forms of Blastomycosis.**—*Sciencia Med.* 1927. Nov. Vol. 5. No. 11. In Portuguese pp. 615–619. With 14 figs. on 8 plates. In English pp. 619–623.

The types of blastomycosis found in Brazil are quite distinct from those found in Europe, and resemble those found in the United States of America. Two types are found; one is the common form and is the same as that described in America as coccidioidal granuloma, caused by *Coccidioides immitis* [Mycoderma immitis (Rixford and Gilchrist 1897)]; and the other is rare and is the same as systemic blastomycosis due to *Mycoderma dermatitis* (Gilchrist & Stokes 1898). A case illustrative of each type is described.

P. T.

DA FONSECA (O.) & LEÃO (A. E. de Arêa). Réaction cutanée spécifique avec le filtrat de cultures de *Coccidioides immitis*. [**Specific Cutaneous Reaction with Filtrate from Cultures of *Coccidioides immitis*.**—*C.R. Soc. Biol.* 1927. Vol. 97. No. 36. pp. 1796–1797. [Oswaldo Cruz Inst. & Dermat. Clinic, Faculty of Med., Rio de Janeiro.]

In two patients with coccidioidal granuloma, specific cutaneous reactions were obtained, by injecting into the dermis of the forearm, the filtrate through a Berkefeld candle of culture fluid from cultures of *Coccidioides immitis* grown for 6 months at laboratory temperature on broth, pH 7.4. No reaction was given in cases of sporotrichosis, tropical ulcer, or by normal subjects.

P. T.

DA FONSECA, Filho (Olympio) & LEÃO (A. E. de Arêa). [In Portuguese & English.] Reacção do desvio do complemento do granuloma coccidioidico. A sensibilidade do filtrado de cultura do *Coccidioides immitis* usado como antígeno. **Complement-Fixation Test in the Coccidioidal Granuloma, the Use of Culture Filtrates of "*Coccidioides immitis*" as Antigen.**—*Sciencia Med.* 1927. Dec. Vol. 5. No. 12. In Portuguese pp. 682–683. In English pp. 684–685.

— & —. Déviation du complément dans le granulome coccidioidico. Sensibilité du filtrat de culture de *Coccidioides immitis*, employé comme antigène.—*C.R. Soc. Biol.* 1927. Vol. 97. No. 36. pp. 1776–1777. [Oswaldo Cruz Inst. & Dermat. Clinic, Faculty of Med., Rio de Janeiro.]

Two antigens were used in the tests: (1) cultures of *Coccidioides immitis* grown for 2 months at laboratory temperature on agar pH 7.4,

emulsified in 0.85 per cent. sodium chloride solution, and heated for 2 hours at 60° C. : (2) another antigen prepared from the filtrate of cultures on broth pH 7.4, grown at laboratory temperature for 6 months. The first had a high, and the second a low, anti-complementary power. Reactions were tried with serum from 3 patients with coccidioidal granuloma, using serum of guineapig as complement. Both antigens gave complete fixation with 0.1 cc. of antigen and 0.1 cc. of the patient's serum ; but the results with the first were irregular. The second antigen is very sensitive and gave complete fixation with 0.006 cc. of patient's serum. No reaction was given with normal or syphilitic sera. With sera from patients with chromo-blastomycosis and eczema marginatum positive reactions were given ; but only with 0.1 cc. and 0.2 cc. of serum respectively.

P. T.

DA FONSECA (O.) & LEÃO (A. E. de Arêa). Dermatite blastomycosique. [**Blastomycotic Dermatitis.**]—*C.R. Soc. Biol.* 1928. Mar. 2. Vol. 98. No. 8. pp. 622-623. (Oswaldo Cruz Inst., & Dermat. Clinic, Faculty of Med., Rio de Janeiro, Brazil.)

This is the first case of blastomycotic dermatitis recorded in Brazil. The patient was a white labourer aged 39. The disease began as an ulceration of the left foot and extended up the leg and attained the pubic region. It appeared as nodules which ulcerated and healed, leaving whitish retractile scars. Multiple ulcerous lesions then appeared on the face, involving the eye-lids, malar region, chin and cheeks, and, later, the mucosa of the mouth. Death occurred from cachexy ; and at autopsy it was found that the condition was not generalized.

In the tissues the parasite appeared as spherical double-contoured cells, reproducing by budding. The parasite was not cultivated, but it appears to be the same as *Mycoderma dermatitis* (Gilchrist & Stokes 1898).

P. T.

MAZZA (Salvador) & PARODI (Silvio). Micosis laríngea con parásitos análogos a los "Megalosporidios" de Posadas. (Nota previa.) [**Laryngeal Mycosis associated with a Parasite allied to the Megalosporidium of Posadas.**]—*Bol. Inst. Clin. Quirúrg.* Buenos Aires. 1927. Vol. 3. No. 26. 8 pp. With 5 text figs. [1 ref.]

The patient from whose larynx a tumour the size of a nut (nuez) was removed post-mortem had exhibited during life a pre-laryngeal abscess. This had been operated upon, but did not heal, there being a residual fistula which was thought to be tuberculous.

Examination of the tumour showed that within the granulation tissue were numerous masses varying in size to 80 microns, rounded or oval. They contained many small bodies, irregular or roughly quadrangular in shape, each 4-5 microns in diameter. These might be found singly (from bursting of the larger mass) or aggregated within a cyst-wall. Some of these "sporangia" were filled with the small bodies, in others they were disposed peripherally, surrounding a clear space internally.

The author does not identify the "parasite" but recognizes its close similarity morphologically and in pathogenicity to that described by POSADAS in 1898 and denominated *Megalocytosporidium* or *Megalosporidium* [= *Mycoderma immite* (Rixford & Gilchrist 1897)].

He regards it as one of the parasitic Phycomycetes and it causes death by generalization; it does not form hyphae or mycelium when parasitic in the body, but grows as sporangia and belongs to the family Mucoraceae.*

H. Harold Scott.

DA FONSECA (O.) & LEÃO (A. E. de Arêa). Sur le granulome coccidioidal. Formes d'évolution du parasite dans les tissus, dans le pus des ganglions lymphatiques et dans les cultures. Position systématique du *Coccidioides immitis*. [**On Coccidioidal Granuloma. Evolution Forms of the Parasite in the Tissues, Pus of the Lymphatic Glands, and in Culture. Systematic Position of *Coccidioides immitis*.**—C.R. Soc. Biol. 1928. Mar. 2. Vol. 98. No. 8. pp. 619–621. [Oswaldo Cruz Inst., & Dermat. Clinic, Faculty of Med., Rio de Janeiro, Brazil.]

In the tissues and in the pus the parasite appears as spherical cells, with a double contour, measuring 5–80 microns in diameter. Similar cells appear in culture only when the fungus is grown in broth or on agar media of pH 7.4. On media containing sugar, spherical cells are formed for the first few days, but then only sterile, septate, hyphae are developed. Reproduction is exclusively by means of endogenous spores, which are liberated by the rupture of the mother-cell; or, apparently, through pores in the membrane of the mother-cell.

P. T.

CAMPOS (Ernesto de Souza) & DE ALMEIDA (Floriano Paulo). Contribuição para o estudo das "Blastomycoses" (Granulomas Coccidioides) observadas em São Paulo. [**Blastomycoses (Coccidioidal Granuloma) in São Paulo.**—Ann. da Faculdade de Med. de S. Paulo. 1927. Vol. 2. pp. 203–215. English summary pp. 216–220. With 21 figs. (6 coloured) on 15 plates. [26 refs.] [Microb. Lab., Faculty of Med., S. Paulo, Brazil.]

Histological study of 12 cases of blastomycoses in S. Paulo showed that 10 of them were similar, the parasites in each varying in size from minute coccus-like bodies to cells 25 to 30 microns in diameter, and never showing yeast-like budding. Comparison with two cases of coccidioidal dermatitis from California and Maryland, U.S.A., showed that they differed from these by not having intracellular spores. The two remaining cases differed from the first 10 and also from each other. In one the parasites were small and scattered in the tissue; while in the other many of the parasites exhibited yeast-like budding.

P. T.

RIESMAN (David) & AHLFELDT (Florence E.). **Coccidioidal Granuloma. I. Review of the Clinical Data with Report of a Pennsylvania Case.**—Amer. Jl. Med. Sci. 1927. Aug. Vol. 174. No. 2. pp. 151–167. [33 refs.] [William Pepper Lab., Univ. Pennsylvania.]

The patient was a boy aged five, and the disease was of one year's duration and terminated fatally. The chief symptoms were continued

* [The systematic position of this fungus is very uncertain; it is at present regarded as belonging to the Arthosporaceae and from cultural characters is placed in the genus *Mycoderma*.—P. Tate.]

low fever, enlarged glands in the neck and back; and, later, the development of multiple abscesses on head, neck and chest. Spherical cells, 15 to 40 microns in diameter, with a double contoured capsule, were present in the tissues. Sometimes they were filled with spores, but no budding forms were seen. Cultures were obtained of a sterile mycelium.

Intravenous, intraperitoneal and subcutaneous inoculation was positive in guineapigs and rabbits, resulting in nodule formation in the lungs, spleen, liver and testicles. The organism was present in the nodules and recultivation was possible from them.

A brief review of 87 cases is given. 70 of the 78 cases in which the place of residence is stated, occurred in California, 19 being in the San Joaquin Valley. The lesions may remain localized and superficial, in which case the disease may run a chronic course from 10–15 years; but as soon as the condition becomes systemic it takes an acute form and is rapidly fatal. The only effective treatment is excision of the lesions while they are localized. Generalized cases are always fatal.

P. T.

DE ALMEIDA (Florianópolis) & DOS SANTOS (Lourival F.). Sobre um caso de "Blastomycose" pulmonar. [**A Case of Pulmonary Blastomycosis.**]—*Ann. da Faculdade de Med. de S. Paulo.* 1927. Vol. 2. pp. 221–226. With 5 figs. on 3 plates. English summary p. 226. [19 refs.] [Microb. Lab., Faculty of Med., S. Paulo, Brazil.]

In sections of a lung numerous giant cells were seen containing parasites, which the authors consider to be similar to the fungus which is the most common cause of blastomycosis in S. Paulo.

P. T.

SANDERSON (Everett S.) & SMITH (Dudley C.). **The Effect of Gentian Violet on the Organism of Blastomycotic Infection.**—*Arch. Dermat. & Syph.* 1927. Aug. Vol. 16. No. 2. pp. 153–155. With 5 figs. [6 refs.] [School of Med., Univ. of Virginia.]

The organism used in the tests was recently isolated from a case of systemic blastomycosis [*Mycoderma dermatitis*?]. The growth of cultures on agar plates was completely inhibited by concentrations of gentian violet, up to and including 1 in 500,000; and there was marked inhibition with a concentration of 1 in 1,000,000. It is suggested that intravenous injections of this dye might be efficacious in treating systemic blastomycosis in man.

P. T.

NICAUD (P.). Les réactions humérales dans l'aspergillose. [**Serological Reactions in Aspergillosis.**]—*Presse Méd.* 1927. Dec. 7. Vol. 35. No. 98. pp. 1489–1490. With 1 text fig. [20 refs.]

Serological tests were made with cultures of *Aspergillus fumigatus* isolated from a case of pulmonary aspergillosis. Cultures of the fungus on serum from the patient did not cause precipitation or agglutination, and the serum exercised no fungicidal action. Sporogglutination and the fixation reaction gave negative results. Cuti- and intradermal reactions were tested with antigens prepared in three different ways from cultures on Raulin's fluid. The only antigen which gave good results was prepared as follows. The mycelium from 5 Roux flasks, each containing 150 cc. of Raulin's medium and incubated at 33° for 48 hours, was ground up for 24 hours in a glass bead apparatus. 2 cc. of the ground mycelium were diluted in 10 cc.

of 0.77 per cent. sodium fluoride solution; and the suspension heated to 60° C. for 30 minutes. The cuti-reactions were not satisfactory, but, with this antigen, marked and definite intradermal reactions were given with cases of pure aspergillosis, and with a mixed infection of tuberculosis and aspergillosis; while the controls, normal subjects and a case of pure tuberculosis, were negative. Attempts at therapeutic treatment with the antigen as vaccine had to be abandoned, owing to its inducing an intense reaction at the infected region of the lungs.

P. T.

SICA (Enrico). Bronco-Pneumonicosi Aspergillina. [**Pulmonary Aspergillosis.**—*Riforma Med.* 1927. Sept. 19. Vol. 43. No. 38. pp. 896-897. With 3 text figs. [Hosp. for Incurables, Naples.]

Details are given of a man who for nearly ten years had suffered from a troublesome cough, with attacks of shivering and fever. Such patients are usually diagnosed as phthisical, but repeated tests failed to reveal the tubercle bacillus, and the chief clinical differences are the absence of wasting and the scarcity of physical signs.

Aspergillus fumigatus was grown from the sputum of this patient, and cure obtained by potassium iodide. At the end of 7 months' treatment he was taking 180 drops daily of a saturated solution.

H. Harold Scott.

GALBREATH (W. R.) & WEISS (Charles). **Bronchomoniliasis in Porto Rico.**—*Porto Rico Rev. of Public Health & Trop. Med.* 1928. Mar. Vol. 3. No. 9. pp. 367-375. [17 refs.] [Presbyterian Hosp., San Juan, P.R., & School of Trop. Med., Univ. Porto Rico.]

In addition to a short general review of the subject, a case of bronchomoniliasis occurring in Porto Rico is described. The condition was of over 10 years' duration and clinically simulated acute pulmonary tuberculosis, but tubercle bacilli were not found in the sputum. Yeast-like cells were present in the sputum and cultures of *Monilia psilosis* were repeatedly obtained from it.

P. T.

VAN DEN BRANDEN (F.) & MOREELS (W.). Un cas de bronchomycose due à des aspergillus diagnostiqué au Stanley-Pool chez un noir. Note préliminaire. [**A Case of Bronchomycosis due to an Aspergillus at Stanley-Pool. Preliminary Note.**—*Ann. Soc. Belge de Méd. Trop.* 1927. Nov. Vol. 7. No. 2. pp. 95-97. [1 ref.] [Leopoldville Lab., Belgian Congo.]

Cultures of an *Aspergillus* were obtained from the sputum of a negro, whose condition was clinically diagnosed as pulmonary tuberculosis, but in whose sputum the Koch bacillus could not be detected.

P. T.

MAGALHAES (O.). Sur les lésions, provoquées par l'*Oidium brasiliense* (O. Magalhaes, 1914) [**On the Lesions caused by *Oidium brasiliense*.**—*C.R. Soc. Biol.* 1927 Oct. 21. Vol. 97. No. 27. pp. 1093-1094.

The lesions caused by *Oidium brasiliense* were studied in man, teetee and squirrel monkeys, black and brown rats, mouse, guinea-pig and rabbit. Generalized and local lesions result. The former are haemorrhages and necroses, and the latter are nodular. The nodules do not show the three zones of Gougerot, and are characterized by: the

presence of the parasite in the resistant stage; absence of giant cells and of epithelioid cells; infiltration with polynuclears, and sometimes eosinophiles and mononuclears; absence of perivascular infiltration with mononuclears; presence of inflammatory connective tissue encircling the centre of the nodule; and absence of "plasmazellen" and fuchsinophiles.

The fungus appears in the tissues either in the form of yeast cells or as mycelium. Sometimes small abnormal coccus- or bacillus-shaped invasions forms are found. Large resistant forms arranged in mosaics and yeast cells also occur.

P. T.

ORLANDI (Noel). Granulom der Conjunctiva durch "Rhinosporidium seeberi." (Erstmalige Beobachtung in Europa.) [**Granuloma of Conjunctiva caused by *Rhinosporidium seeberi*.**]—*Virchows Arch. f. Path. Anat. u. Physiol.* 1926. Vol. 262. pp. 314–327. With 6 text figs. (1 coloured). [32 refs.] ["Ospedale Maggiore," Milan.]

This case of rhinosporosis is the first to be observed in Europe and the first in which the subject was a woman. It is the seventh recorded case in which the conjunctiva was attacked.

The patient, a woman aged 56, was wounded in the right eye by a splinter of wood, which caused a slight contusion on the eyeball. On this spot, a slowly enlarging growth arose and attained about the size and form of a lentil. It was surgically removed; and again grew to about half the size in a year and a half, and was again removed. After a few months it grew once more and was removed for the third time. This seemingly resulted in a cure, as there has been no renewed growth for several months.

The author's observations confirm ASHWORTH's results as regards the morphology and development of the parasite [ASHWORTH 1923. *Trans. Roy. Soc. Edin.*, Vol. 53, pp. 301–342; this *Bulletin*, Vol. 20, p. 451]. He agrees with ASHWORTH in considering the organism to be a Phycomycete and in placing it provisionally in the family *Olpypidiace* of the *Chytridiaceae*, under the name *Rhinosporidium seeberi* (Wernicke, 1903).

P. T.

SMITH (E. C.). **Moniliasis Linguae.**—*Jl. Trop. Med. & Hyg.* 1928. May 1. Vol. 31. No. 9. pp. 101–102. With 3 text figs. [2 refs.] [Med. Research Inst., Lagos.]

A thrush-like affection of the tongue is common in infants in Lagos. Yeast-like cells and mycelial fragments are present in the lesions, from which cultures of a *Monilia* belonging to the *Monilia pinoyi* group of Castellani were obtained.

P. T.

LANGERON (Maurice). Les prétendues mycoses de la rate. [**So-Called Mycoses of the Spleen.**]—*Ann. Parasit. Humaine et Comparée.* 1928. Apr. 1. Vol. 6. No. 2. pp. 211–220. [3 refs.] [Parasit. Lab., Faculty of Med., Paris.]

—, Que penser des mycoses de la rate?—*Presse Méd.* 1928. Apr. 18. Vol. 36. No. 31. pp. 481–482. [6 refs.]

From a review of the literature on the subject and from personal investigation of certain of the cultures supposed to be isolated from

cases of splenic mycoses, and of a number of spleens which were considered to be infected, the author concludes that there is no justification for considering that there is a mycotic splenomegaly. He considers that the fungi which have been obtained in cultures from spleens are accidental contaminations of common non-pathogenic moulds; and that the so-called mycelial filaments and conidial structures in the spleens are really pathological modifications of fibrin and collagen in hæmorrhagic zones.

P. T.

PRESSE MÉDICALE. 1928. May 9. Vol. 36. No. 37. pp. 579-581.

—A propos du mémoire de M. LANGERON: Que penser des mycoses de la rate? Réponses de MM. NANTA, P. EMILE-WEIL, PINOY. Réponses aux objections de MM. NANTA, P. EMILE-WEIL et PINOY par Maurice LANGERON. [**Concerning Langeron's Article on Splenic Mycoses. Replies of Nanta, P. Emile-Weil & Pinoy. Reply to these Objections by Langeron.**]

Nanta replies to Langeron's criticism by saying that "mycotic splenomegaly" was his first hypothesis; that the filaments may be demonstrated apart from any hæmorrhagic zones (i.e., in ganglia); that nodules similar to Gandy-Gamna nodules have been obtained experimentally in the foot of a pigeon by inoculation with a *Madurella*; that the work of JADASSHONN and BLOCH on "haematogenous trichophytoses" in man suggest the manner in which the fungus could invade the spleen; and, finally, that OTA has found *Aspergillus jeanselmei*, a parasite of the skin of man, in the spleen of a guinea-pig.

Emile-Weil's chief points in support of the mycotic theory are: in addition to modified mycelial filaments, fructifications and *Aspergillus* heads are present in the nodules; the heads and filaments are phagocytosed; he obtained pure cultures of the *Aspergillus* in 3 out of 6 cases and Nanta obtained the same species in 3 out of 15 cases; the deviation of the complement reaction often permits of a clinical diagnosis; and iodine treatment is effective.

Pinoy first says that Langeron confuses mycotic and bacterial splenomegaly. He considers *A. nantae* to be only a biological form of *A. nidulans*. LUCET, he says, long ago caused splenomegaly in guinea-pigs by intraperitoneal inoculation with spores of *A. fumigatus*. He denies that his cultures were contaminations and gives particulars of the technique employed in making the inoculations. The absence of hollow filaments resisting 40 per cent. potash, he explains as being due to Langeron's not examining a sufficient number of nodules, as filaments attacked by the organism disappear owing to gelification of their membrane.

Langeron replies to Nanta by giving the reference to his first note on the subject in which the etiological agent is referred to as a spirochaete and a streptobacillus. The question of "haematogenous trichophytoses" is at present much disputed, especially in Italy. In connection with OTA's work on *A. jeanselmei*, no animal showed any macroscopical modification of the spleen so that it was not "splenomegaly." To Emile-Weil he replies that serological reactions are of very little or no value when dealing with fungi, and that iodine treatment is not specific for mycoses. To Pinoy he replies that his articles deal only with "mycotic splenomegaly" and that Pinoy himself has described

splenomegaly first as being due to a Synbacterium and later declared that the same parasite was a fungus. He refuses to regard the few negative characters given of *A. nantae* as being sufficient to distinguish it from other species of Sterigmatocystis. LUCET never found spontaneous mycosis of the spleen in guineapigs, and only in experimental mycoses of them, and rarely in other animals, did lesions in the spleen occur. As these lesions resulted from massive doses with spore emulsions the results are not reliable in comparison with spontaneous disease. Finally, he points out that the walls of fungi are formed of a substance analogous to chitin of insects of which no gelification is known to occur.

P. T.

OBERLING (Ch.). Le rôle pathogène de la mycose splénique de Nanta. [**Pathogenicity of Nanta's Splenic Mycosis.**]—*Presse Méd.* 1928. Jan. 4. Vol. 36. No. 1. pp. 2-3. [6 refs.]

As a result of the recent work of NANTA, PINOY, WEIL, ASKANAZY, etc., on mycotic splenomegaly, the author reinvestigated his collection of over 200 spleens obtained by operation or at autopsy. 24 of them were found to have mycotic infection, and to contain the Gandy-Gamna nodules shown to be of mycotic origin by NANTA and others. In 10 of these cases, the mycelium was calcified and degenerate; but in the remaining 14 the mycelium was well preserved. In all of the 4 cases of Banti's disease mycotic nodules were found; and other cases in which they were found include calculous cirrhosis; lymphoid leucaemia; congenital icterus; cicatrices of infarctus; pigmentary cirrhosis; splenomegalic cirrhosis with haemolytic icterus; and Algerian splenomegaly.

In consequence of the variety of pathological conditions in which mycotic infection is found, the author considers that it is only a secondary infection of spleens already diseased in some manner. The mycotic infection may follow one of two courses: (1) The mycosis develops for a time and then retrogresses and the lesions undergo cicatrication; and this appears to be true of the majority of the author's cases. (2) In some cases the mycosis develops rapidly and infiltrates the spleen with mycotic nodules. In the latter case it probably influences the clinical symptoms and ultimately gives to symptoms entirely due to the mycotic infection.

P. T.

POPPER (M.) & RAILEANU (C.). Sur la splénomégalie mycosique. [**On Mycotic Splenomegaly.**]—*Bull. et Mém. Soc. Méd. Hôpit. de Bucarest.* 1928. Feb. Vol. 10. No. 2. pp. 48-52.

Examination of the collection of spleens in the clinic [Bucarest, Roumania] resulted in Gamna-Gandy nodules being found in two of them, and, in one, structures considered to be fragments of mycelium and fructifying heads of aspergillus. The clinical symptoms were cirrhosis of the liver with splenomegaly and ascites, and, in one case, inflammation of the portal vein.

P. T.

GAMNA (Carlo). A propos de mycose splénique. [**On Splenic Mycosis.**]—*Presse Méd.* 1928. Mar. 21. Vol. 36. No. 23. p. 357. [Med. Clinic., Univ. Siena.]

The author deprecates the manner in which recently certain authors, following the work of NANTA & PINOY, etc., on splenic mycosis, have accepted the presence of "Gamna nodules" as being diagnostic of splenic mycosis and regard these nodules as "mycotic tubercles." He has described these nodules from many different diseases of the spleen, and maintains that there is as yet no decisive evidence that the lesions are specifically mycotic. He questions whether the filaments in the spleens are really of mycelial origin, and points out that in only 3 or 4 cases have cultures of fungi been isolated from spleens, and, even in these, the pathogenicity of the fungus is still to be proved. He agrees with OBERLING's recent criticisms on the subject. [See above.]

P. T.

GOSSET (A.), BERTRAND (I.) & MAGROU (J.). Recherches expérimentales sur l'aspergillose splénique. [**Experimental Researches on Splenic Aspergillosis.**]—*C.R. Soc. Biol.* 1928. Mar. 16. Vol. 98. No. 10. pp. 769-770. [1 ref.]

A suspension of aspergillus spores [*A. nantae*?] in physiological serum was injected into the spleen and perirenal fat of a rabbit. The animal underwent progressive cachexy and, a month later, was found to have developed ascites; enlarged spleen with indurated zones; a lobulated mass in the mesentery; and pseudo-tuberculous lesions in the lungs. With the exception of spherical, brown masses, 15-20 microns in diameter, which were found in the spleen and ascites fluid, and are considered by the authors to be disorganising fungus structures, no mycelium was found in the organs or in the various lesions.

P. T.

PETZETAKIS (M.) & PAPADOPOULO (J.). Sur un champignon isolé en culture pure de la rate d'un cas de splénomégalie égyptienne. [**On a Fungus obtained in Pure Culture from a Case of Egyptian Splenomegaly.**]—*C.R. Soc. Biol.* 1928. May 21. Vol. 98. No. 16. pp. 1391-1392.

Cultures of a fungus, as yet unidentified, were obtained by inoculating Sabouraud's medium with splenic pulp obtained by puncture from a case of Egyptian splenomegaly.

P. T.

VERGA (Pietro). Pseudotumore della milza. [**False Tumour of the Spleen.**]—*Pathologica.* 1928. Jan. 15. Vol. 20. No. 435. pp. 7-13. With 6 figs. on 2 plates. [22 refs.]

Conditions closely resembling, if not identical with, that described by the author have been recorded under various names, of which the following may be mentioned: Splen-adenoma (ORTH), circumscribed fibrous induration (VIRCHOW *et al.*), nodular hyperplasia (PFISTER *et al.*)

splenoma (CESARIS-DEMEL). Some have regarded the enlargement as merely hyperplastic, others as a blastoma. It is found only in elderly subjects.

The author's patient was a woman of 76 years, dying with signs of bronchopneumonia. At autopsy there were atheromatous and analogous vascular changes. The organs were mostly natural for a woman of this age except the spleen and one kidney. The left kidney was only one-third the normal size. The spleen measured 10 by 6 by 4 cm., and weighed 140 gm., and showed many small nodules, one 3.5 cm. in diameter. Microscopically, there was excess of fibrous tissue in strands radiating to the capsule, the meshes containing in the central parts mainly lymphocytes with plasma cells and polymorphonuclears more externally. In places there were small aggregations of coccoid bodies and at the periphery of these mycelial filaments; the cocci were, perhaps, mould-spores.

The author discusses briefly the nature of the condition; there is no proof of blastoma morphologically, and he believes it to be inflammatory, with slow fibrosis associated with mycotic infection.

H. Harold Scott.

REVIEWS AND NOTICES.

GILL (Clifford Allchin). [Lt.-Col. I.M.S., Director of Public Health, Punjab, M.R.C.S. (Eng.), L.R.C.P. (London), P.D.H. (Eng.), D.T.M. & H. (Eng.), etc.] **The Genesis of Epidemics and the Natural History of Disease. An Introduction to the Science of Epidemiology based upon the Study of Epidemics of Malaria, Influenza, and Plague.**—pp. xxvi+550. With 19 charts, 10 maps & 1 diagram. 1928. London: Baillière, Tindall & Cox, 7 & 8, Henrietta Street, Covent Garden, W.C. 2. [21s.]

Lieutenant-Colonel Gill's book supplies further proof, if proof were needed of the fact that a Sydenham revival is in progress. In his preface, he tells of the conception in 1914, of "a working hypothesis, which appeared to resume the phenomena exhibited by epidemic malaria"; while, after the war, in 1921, this hypothesis assumed concrete shape in a paper entitled "The Rôle of Meteorology in Malaria"; and the author was prompted later to take up the study of epidemics generally. "Plague, relapsing fever, influenza," Lieutenant-Colonel Gill says, came under scrutiny, "owing to the fact that great epidemics of these diseases were apt to obscure the epidemiological picture," and "it was during the course of these subsidiary investigations that the remarkable similarity of all epidemical phenomena first came prominently to notice." Lieutenant-Colonel Gill seems thus to have been led to the "Quantum Theory" and the "Unitary Mechanism of Epidemics" very much as SYDENHAM was led, 250 years ago, to his doctrine of interaction between infectious particles and the blood and humours of the body (*Medical Observations*, 1.1.6) and to his Epidemic Constitutions. It is the old story of Saul, over again, going out on a subsidiary quest and finding a kingdom. Lieutenant-Colonel Gill, moreover, seems to have journeyed along the same road, in his study of the epidemic wave, as that followed by FARR, RANSOME, POWER, WHITELEGGE and Shirley MURPHY, and later by OWEN H. PETERS, BROWNLEE, ROSS and many another epidemiologist in more recent years.

Lieutenant-Colonel Gill comes right up against the main problem, of course, when he tackles influenza. We find him, at first (p. 220), attempting "to explain pandemics of influenza in terms of a change of quantum rather than as the expression of a qualitative change affecting any of the factors." SYDENHAM was presented with a similar difficulty in 1675. On p. 454, however, Lieutenant-Colonel Gill is laying stress "in large measure" on "the immunity factor." Moreover (on p. 477, para. 2), he observes, "it is not open to doubt that the recent pandemic of influenza, as well as some of its predecessors, was preceded, and followed, by a change in the quality of disease, and, more especially, by the relatively frequent occurrence of certain peculiar diseases of the nervous system, referred to by SYDENHAM as 'nervous and comatose diseases,' and now known as poliomyelitis, cerebro-spinal fever and *encephalitis lethargica*."

On p. 479 Lieutenant-Colonel Gill says "the theory of epidemic constitutions is not uniformly applicable to all pestilences," but he agrees that, in influenza, "it does afford an explanation of certain concomitants."

Two perusals of "The Genesis of Epidemics" have convinced the present reviewer that it is a work to be read, marked, learned and inwardly digested. Time has not permitted of comment upon the many questions of special importance, in connexion with Indian epidemiology, as seen from Lahore; and space has imposed strict limitation as regards such problems of general epidemiological interest as may come within the ken of an observer in these islands. SYDENHAM said if you would fish out the species of a continued fever you must choose as your field of observation some large and populous place, and it would certainly appear from Lieutenant-Colonel Gill's book that even if the "Laws of Nature," as revealed in

epidemic manifestations, be mystical and inscrutable, they at any rate seem to operate in a remarkably similar way, whether they be studied in the Punjab or in SYDENHAM'S London.

W. H. Hamer.

MAYO (Katherine). **Mother India.**—391 pp. 1927. London: Jonathan Cape, 30, Bedford Square. [Paper 7s. 6d., Cloth 10s. 6d.] [Received for review May, 1928.]

Miss Mayo is not the first American who has called attention to some of the weak spots in Indian life and character. In 1912 Price COLLIER wrote "The West in the East." Being a man he could not obtain first hand evidence as to the lives of the women of India; but concerning the trammels of "caste," the tyranny of the Brahmins and the horrors of the worship of Kali by Hindus, he was in entire agreement with the authoress of "Mother India." The book is not concerned alone with sociology; it appeals also to those who study medicine, especially obstetrics and the care of children, and to the anthropologist. You cannot raise a race, healthy in mind and body, from faulty and unfavourable foundations, and the foundations of all nations are the mother and child. When first published this book raised a storm of criticism, but its truth within limits cannot be denied. It was not Miss Mayo's object to speak only of pleasant things. It is well for a nation to consider the weak spots. The first chapter tells of a visit to Kali's temple in Calcutta with its strange ceremonies and rivers of blood from animals slain for sacrifice. Then follow many pages dealing with child marriage. Religion and tradition demand that every Hindu girl shall be married before she reaches puberty, and she expects motherhood at 10 to 12 years of age. In most cases boy and girl are betrothed and separated until they reach the age of puberty, when the final nuptial ceremonies are performed. In spite of this immaturity these boys and girls raise many babes, out of the thousands born only to die early, and the population of India increases. The most objectionable form of child marriage occurs when a grown man, he may be a widower of fifty, takes a child wife to his home before she is physically fit for the life. In many cases the results are terrible, either death of the girl or crippling for life. The legal age of consent is 12 years, and if a violated wife dies under age the husband is regarded as a criminal and treated as such—when discovered. In an Appendix Miss Mayo gives a list of some of these pitiable cases (*Legislative Assembly Debates*, 1922, p. 919). Here we may state that Miss Mayo writes not only from observation but from careful reading of official documents and Indian books and journals; full references are given in the "foot-notes." In child-birth the conditions are as bad as can be. Unclean, the woman is put into the worst room in the house, often into an outhouse, and she is attended by the local dhai, a midwife, compared to whom "Mrs. Gamp" was a pattern of skill and cleanliness. Much is being done to improve Indian dhais through the Government medical departments and in the hospitals for women; but the number that seek education is small, and not enough for the millions who need their help. We next come to the sad life of the Hindu widows, a life doubly sad when we consider that many of them are children and were wives only in name. The oppression of caste rules and the power of the Brahmin priests are fully dealt with. The smallest details of life are governed by religion and ruled by the Brahmins, of whom it may be said:

"There are who lord it o'er their fellow men
With most prevailing tinsel."

(Keats.)

The drawbacks of life secluded behind the purdah, the want of education, absence of sanitation, economic and political difficulties, well known to those who work in the Indian Empire, are fully discussed. Miss Mayo, so far as her information goes, gives credit to English and Indian men

and women who have worked for improved conditions and she records evidence of better things with full discussion and statistics. Although Miss Mayo's strictures apply to at least two-thirds of the population they do not apply to everyone. Except for the drawbacks of "purdah" life and neglect of education they do not apply to the Mahomedans, only in part to the Sikhs and not at all to the Parsees and some other small communities. The criticisms are in the main true; but they are not new. For about one hundred years an English Government has been striving to improve the social and economic conditions of the people of India. But traditions and customs backed by religion are serious obstacles, and our hands are tied by the Proclamation of 1858 and subsequent Acts. There is a striking instance quoted on page 32 of "Mother India": The law forbidding traffic in Obscene Publications carries the following amazing exception:—

"This section does not extend to any book, pamphlet, writing, drawing or painting kept or used *bona fide* for religious purposes, etc."

Reform to be general and of any value must begin with the Indian people themselves. We hear and read the cry: "India for the Indians." A nobler and more useful slogan would be: "Indians for India."

J. H. Tull Walsh.

i. CALCUTTA. **Annual Report of the Calcutta School of Tropical Medicine Institute of Hygiene and the Carmichael Hospital for Tropical Diseases 1927.** [MEGAW (J. W. D.), Director.]—107 pp. With 8 maps & 1 chart. 1928. Calcutta: Bengal Govt. Press.

ii. INDIAN MEDICAL GAZETTE. 1928. Vol. 63. Supplement to May Number. 48 pp.—**The Indian Medical Year. Being a Review of the Progress of Medicine, Surgery and Public Health in India during 1927.** Edited by Lt.-Col. R. KNOWLES, I.M.S. [1 Rupee.]

i. This concise and well-written Report shows that excellent work has been done during 1927 and the Director regrets that the teaching staff is not yet complete owing to want of funds; a professor of biochemistry and a professor of helminthology are urgently needed. The school is for research work and post-graduate teaching and deals only with tropical diseases. A table on page 15 shows that applications for admission, chiefly from Bengal, come from all parts of the Empire and even from outside: Egypt, Africa, Dublin and New York. Owing to want of space and limited staff many applicants must be refused. The main part of the Report is occupied by special reports from the various professors: Tropical Medicine (MEGAW) contains seven maps showing the distribution of: leprosy, relapsing fever, endemic goitre, filariasis, lathyrism, gumma-worm and osteomalacia. Then follow reports on bacteriology, pathology and helminthology (ACTON); protozoology (KNOWLES); pharmacology (CHOPRA); immunology (LLOYD); entomology (STRICKLAND); hygiene (STEWART); public health laboratory practice (KHAMBATA) and chemistry (GHOSH).

In the several Research Departments much good work was done with funds provided by the 'Indian Tea Association' and the 'Indian Research Fund Association' for kala azar (NAPIER); by the 'Indian Jute Mills Association' for hook-worm (MAPLESTONE); by the 'Indian Mining Association' for bowel diseases (MAITRA); by the 'Indian Research Fund Association' and School Endowment Fund for leprosy (MUIR). Work on diabetes (BOSE) was endowed by Mrs. MITRA in memory of her husband and the 'Darbhanga Research Endowment' supported the work of the filarial survey (RAO). Apart from these strictly technical matters the year 1927 will be memorable for two events: the first of these was the unveiling of a "Gate of Remembrance" to commemorate the discovery of mosquito transmission of malaria by Ross in 1898. Sir Ronald Ross was present and

declared that it was the proudest moment of his life. He recalled the names of LAVERAN and of MANSON "from first to last my sponsor, and the man who put me on the right trail." The second event was the meeting of the Seventh Congress of the Far Eastern Association of Tropical Medicine and part of the School was used for sectional meetings and exhibits.

ii. "The Indian Medical Year" was published as a Supplement to the May number of the *Indian Medical Gazette* and extra copies can still be obtained. It is worth buying. It is not entirely a statistical report of the health of the people of India; but deals with this and with books and papers published during 1927, mostly work done by officers of the Indian Medical Service. The papers referred to have appeared in other journals and together with some of the books have been noticed in this *Bulletin*. The subjects dealt with are the same as those referred to in the Report, but with more detail and for a wider circle of readers. The editor, Lt.-Colonel R. Knowles, expresses his grateful thanks to the numerous contributors who have helped to make this review a symposium by different writers.

J. H. Tull Walsh.

NAPIER (L. Everard). [M.R.C.S., L.R.C.P. (Lond.), in charge Kala-Azar Research Calcutta School of Tropical Medicine.] **Kala-Azar. A Handbook for Students and Practitioners.** 2nd Edition.—pp. viii+203. With 18 plates (5 coloured), 15 charts, 5 maps & 1 key map & 3 figs. 1927. Oxford University Press, London, Bombay, Calcutta & Madras. [8s. 6d.]

This little book, which deals with kala azar chiefly but not entirely as it is found in India, requires no criticism. The author's long experience of the disease from the clinical, epidemiological and experimental points of view entitle him to speak with authority. With a careful avoidance of redundant matter and the use of a clear style he has presented his readers with a concise, accurate and scientific account of the disease in all its aspects. The book can be thoroughly recommended to all those who have to deal with kala azar wherever it occurs.

C. M. Wenyon.

SMITH (Henry) [Lt.-Colonel, C.I.E., B.A., M.D., M.Ch. Indian Medical Service (retired), London. Late Civil Surgeon of Jullundur & Amritsar (Punjab, India).] With the Collaboration of Lt.-Col. A. E. J. LISTER, F.R.C.S., I.M.S. (ret.), London, Dr. Arnold KNAPP, New York, & Dr. J. Russell SMITH, London. **The Treatment of Cataract and Some other Common Ocular Affections.**—pp. xiii + 287. With 68 figs. on plates. 1928. Calcutta & London: Butterworth & Co., Bell Yard, Temple Bar, W.C.2. [15s. 6d.]

This volume deals mainly with the removal of the lens in its capsule, and the author's description of his particular technique is very clear and graphic. He has freely placed the fruit of his great experience of senile cataract as he found it in the Punjab at the disposal of the beginner and has furnished him with full details of how the condition may be most safely dealt with when the author's method of expression of the lens in its capsule is employed. Much of the subject matter has already been published, and papers by J. Russell Smith on Barraquer's operation, by A. E. J. Lister on the after effects of vitreous escape, and by Arnold Knapp on the late results of intracapsular cataract extraction are here reproduced. 'Tumbling' the lens is recommended as the safest method of delivery. Formerly this procedure was attended by some difficulty and risk in the case of the larger and harder varieties of cataractous lens. The

author now describes a technique, devised by him of late, by which he claims these lenses can be 'tumbled' as easily and safely as the Morgagnian type. Briefly this consists in using pressure on the sclera behind the lower margin of the lens with the lens hook and at the same time supporting the upper margin of the lens by the counter-pressure of a spatula placed over the section. The zonule ruptures below and the lower margin of the lens tilts forward; it can then be followed on its upward course by the lens hook folding the cornea beneath it. Smith's method of lid control as he describes it is most valuable and is applicable to other operations which involve opening the eyeball. After operation it is recommended that both eyes should be kept bandaged and undisturbed for a period of ten days. Naturally the author, like most surgeons, is somewhat prejudiced in favour of the type of operation which has proved successful in his own hands, and one can hardly expect him to assume a strictly impartial attitude towards other forms of operation in which the capsule is left in the eye. The disadvantages of the capsulotomy operation, especially when performed on the older type of patient encountered in Europe, are rather exaggerated by him. The ability to dispense with a pad and bandage on the third or fourth day after operation, as one can safely do in the case of the vast majority of elderly patients on whom extraction with capsulotomy and conjunctival flap has been performed, is a considerable asset. The author errs in thinking that the complication of a 'turned section' is always due to the occurrence of a concealed choroidal haemorrhage. The most common cause is a faulty section made on a squeezing patient with tight lids and prominent eyes; a squeeze during convalescence bursts the section and the margin of the upper lid everts the flap. The section of the book which deals with glaucoma and other ocular affections only comprises fourteen pages and it is difficult for the author to do himself full justice within so small a space. The book will be read with interest by all ophthalmic surgeons and will be invaluable to those who wish to undertake the expression of the cataractous lens in its capsule.

H. Kirkpatrick.

HOSPITAL FOR TROPICAL DISEASES, LONDON.

A four-paged pamphlet, issued by the Hospital for Tropical Diseases, Endsleigh Gardens, London, W.C. 1, reviews the work of the Hospital in 1927. 635 patients were admitted suffering from various tropical diseases, of which sprue (99 cases), dysentery (90 cases), and malaria (48 cases) head the list. The special features of the Hospital are the private rooms and wards which provide accommodation for paying patients, both European and Non-European. Fifty-six seamen, of whom 24 were coloured, received treatment in the general wards. An out-patient department has been opened during the year for people unable to afford the fees of a consulting room. Benefactions received in 1927 include further endowments for beds from Burma and Ceylon, an artificial sunlight equipment from Mr. Samuel SAMUELS, and a regular supply of bael fruit and paw-paw fruit by friends in the P. & O. Company. The Hospital is a voluntary one, and relies largely on subscriptions and donations for its support. It is under the control of the Seamen's Hospital Society, which has during the year assumed responsibility also for the Queen Alexandra Memorial Hospital at Marseilles, a sister hospital where travellers from the East suffering from tropical diseases may break their journey for treatment before coming on to the Tropical Hospital in London.

The difficulty experienced by medical men in obtaining particulars of newly published books on subjects of interest to them will be largely overcome by the "Quarterly Bibliography of Books on Medicine and Allied Sciences" appearing in the *Medical Press and Circular*. The

Bibliography in the number for July 11th, 1928, covers the period April-June, 1928, and gives over 400 titles of books published in all parts of the world. Though not exhaustive, a check against English booksellers' and publishers' lists for the same period shows that nearly 80 per cent. of possible titles of English books have been included. The Bibliography is compiled in the Sales Department of Messrs. Baillière, Tindall & Cox. It would be improved by the inclusion of the place of publication and publishers' name in all cases, and by stricter attention to the alphabetical arrangement under authors' names.

BUREAU OF HYGIENE AND TROPICAL DISEASES.

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[No. 10

SLEEPING SICKNESS.

LEAGUE OF NATIONS. **Final Report of the League of Nations International Commission on Human Trypanosomiasis.**—392 pp. With 131 figs., 2 coloured plates & 5 maps. 1928. Geneva: Publications of the League of Nations (III. Health. 1927. III. 13. C.H. 629).

The final report of the International Sleeping Sickness Commission is a formidable document consisting of 392 pages. It is divided into seven sections :—

I. Report of the New Sleeping Sickness Focus at Ikoma. By F. K. KLEINE. [pp. 7-20. With 2 figs.]

At Ikoma, Tanganyika Territory, 56 cases of human trypanosomiasis were seen; the parasite was *T. rhodesiense* and the insect carrier *G. swynnertoni*. Kleine states that the cases were without doubt clinically distinct from those he had previously observed. In the majority of the patients the disease in a few months caused complete physical collapse before any definite enlargement of the glands occurred, or infection of the central nervous system became clinically apparent. Trypanosomes were usually numerous in the peripheral blood. The morphological characters of twelve strains were studied in guineapigs inoculated directly from the patients. The percentage of posterior nuclear forms found varied from 0 to 20, and all degrees of transition between the individual strains were observed. The human strains examined at Ikoma were considerably more virulent than those on the Kavirondo Coast.

The conclusions are :—

"1. The two trypanosomes of man, *T. gambiense* and *rhodesiense*, are probably identical.

"2. The various fresh outbreaks of the epidemic in Tanganyika Territory are probably to be traced to immigration of sick natives from the old sleeping-sickness foci on Victoria Nyanza and Lake Tanganyika.

"3. The results of sleeping-sickness therapy will improve in so far as the infected natives can be kept under permanent medical control."

II. Studies on the Bionomics of the Polymorphic Trypanosomes of Man and Ruminants. By H. L. DUKE. [pp. 21-116. With 1 map & 5 figs. (36 refs.).]

In his introductory remarks Duke states that he has endeavoured to throw light on two of the questions in the original terms of reference

of the Commission, viz. : the relationship between Trypanosomiasis gambiense and Trypanosomiasis rhodesiense, and the rôle of ruminants in the spread of human trypanosomes. He wishes it to be understood that his studies, if not actually premature in their appearance, are incomplete. The conclusions are provisional and mainly useful in determining the trend of further investigations.

Stress is laid on confusion which has resulted from the fact that so much importance has been laid on the study of ancient laboratory strains maintained for years in laboratory animals, and on the desirability of limiting observations and deductions to strains transmitted from ruminant to ruminant by cyclical passage through tsetse. Such strains have now been under observation for more than a year at Entebbe, and it is hoped that they will be continued for years ; these strains—both *gambiense* and *rhodesiense*—have been collected from the widely different sources indicated in a map, and with one exception—a *rhodesiense* strain—have been obtained from untreated human beings. As *T. gambiense* offered greater facilities for study it was decided to concentrate first on this parasite. The experimental work is set forth in considerable detail as even seemingly irrelevant information may later prove to be of great importance.

Duke states that it is already known that certain strains of trypanosomes are not cyclically transmissible by tsetse, and in support of this he quotes ROUBAUD (1910), KLEINE (1914) and REICHENOW (1921). This inability to pass cyclically through tsetse may be complete or it may extend only to the final and all-essential invasion of the salivary glands. Some strains are very much more readily transmissible than others, and it is important to recognize these differences in comparing different strains.

In this work a new method has been adopted to indicate the degree of transmissibility or "la contagiosité" of a strain of trypanosomes. For series discussed the percentage of infected flies in any experiment, or series of experiments, gives no reliable information about the transmissibility of the strains by tsetse. In order to discover this certain information is essential and when this has been obtained the transmissibility can be expressed by means of the following formula :—

$$T = \frac{s}{p} \times \frac{n}{N} \times 100$$

Where T=transmissibility index ; N=total number of flies dissected ; n=total number of flagellate-containing flies ; p=number of flies of 25 days old or over ; and s=the number of these mature infected flies which shows gland invasion.

This transmissibility index is a valuable basis on which to compare different strains. Details are given of the technique used in the experiments.

The author then passes to a study of nineteen recently isolated strains of *T. gambiense* from nineteen different untreated African natives in *G. palpalis* areas. An account is given of the origin, upkeep at the laboratory, and the animal reactions of these strains ; and an examination of their cyclical transmissibility by *G. palpalis*, when first isolated from man. This work is set forth in great detail. The data relating to the transmissibility index is summarized [by the reviewer] in the following table :—

SUMMARY OF EXPERIMENTS UPON THE TRANSMISSIBILITY INDEX OF NINETEEN STRAINS OF *T. gambiense*.

Strm	Animal or Patient.	Date.	Total flies dissected.	Total infected flies.	Percentage of infected flies.	Number of infected flies alive on 25th day.		Percentage of gland infections.	Transmissibility Index.
						With glands infected.	Total.		
1	Monkey 52	Mar. 8	216	6	2.7	1	3	0.9	0.9
2	Monkey 53	Apr. 1926	199	7	3.5	0	5	0	0
3	Monkey 90	Mar. 1926	127	1	0.7	0	1	0	0
4	Blasio ...	May and June 1926							
5	Monkey 64	Mar. 1926	155	5	3.8	5	5	1.9	2.2
		Apr. 1926	154	8	5.0	7	7	4.5	5.0
6	Monkey 65	May 1926							
7	Monkey 65	May 1926	150	4	2.6	0*	4	0	0
8	Tekisoka	June 1926	180	13	7.2	6	11	3.3	3.9
9	Zakayo	June 1926	183	3	1.6	0	3	0	0
10	Mangasi	July 1926	158	16	10.1	11	14	6.9	7.9
11	Monkey 149	Aug 1926	158	4	2.5	1	4	0.6	0.6
12	Monkey 162	Aug 1926	218	16	7.3	5	11	2.2	3.3
13	Acholi	Dec 1926	157	3	1.9	1	1	0.6	1.9
14	Boki ...	Dec 1926	139	3	2.1	3	3	1.1	2.1
	Falajala	Dec. 1926	135	7	5.1	4	6	2.9	3.4
15	Awasi	Jan. 1927							
16	Kakowa	Dec. 1926	149	7	4.6	5	5	3.3	4.6
17	Dzungu Pio	Feb. 1927	187	6	3.2	2	4	1.0	1.6
18	Mayani	May 1927	177	1	0.5	0	0	0	0
19	Labilo	Sept. and Oct. 1926	182	0	0	0	0	0	0
			175	0	0	0	0	0	0

[* The figure given in the Report is 3, but this is apparently an error.]

From these experiments the author draws the following conclusions:—

"It is clear from these experiments that, on their first isolation from man, or actually in man himself, different strains of *T. gambiense* show great differences in cyclical transmissibility by *G. palpalis*.

"Of the nineteen strains examined above, twelve were studied in the human patient. Of these twelve strains, four were non-transmissible cyclically by laboratory-bred *G. palpalis*, i.e., 33·3 per cent.

"The transmissibility of a strain seems to bear no constant relation to the virulence of that strain in man. Strains Nos. VII, IX and X all appeared to be virulent in their effects on the patient; their Transmissibility Indices were respectively 3·9, 7·9 and 0·6.

"As a rule, it is very difficult to determine the duration of an infection in a native. Consequently, it is very difficult to determine to what extent prolonged sojourn in man affects the transmissibility of a trypanosome. The condition of the cerebro-spinal fluid indicates the stage of the disease, but it does not tell us much about its duration; a virulent strain may produce big changes in a comparatively short time. The cell-counts of the cerebro-spinal fluid from five of the six patients who supplied the non-transmissible strains were as follows:—

Strain.	Per cubic mm.
III	2·5
VIII	11·5
XVII	415
XVIII	6
XIX	1610

and these figures teach us nothing definite. Taking now the cases showing the greatest alteration of the cerebro-spinal fluid:

Strain.	Cells per cubic mm.	Index.
XV	106	4·6
VII	208	3·9
XVII	415	0·0
IX	560	7·9
XII	1,030	1·9
XIX	1,610	0·0
II	1,900	1·2 (cf. Part II)
X	2,320	0·6

and again there is little to learn.

"Possibly there is a slight indication that a low degree of transmissibility is associated with a much-changed cerebro-spinal fluid, and this with an old-standing infection; but this is little more than speculation.

"More justifiable would seem the inference that, at any stage of an infection of man by *T. gambiense*, the transmissibility of the trypanosome by *G. palpalis* may be lost."

[The reviewer has some doubt whether anything of the nature of criticism is desirable in this *Bulletin*, and for that reason rarely ventures to express any opinion on the papers he summarizes. This article is, however, of more than usual importance, not only by reason of the subject dealt with, but also because it emanates from a member of an International Commission and therefore demands more than ordinary consideration. The reviewer has the greatest respect and admiration for careful work of this kind, and a very lively appreciation of the difficulties with which those who carry on such fundamental investigations have to contend. It is to be hoped, therefore, that the few remarks which follow will not be regarded as captious and carping criticism, but rather as suggestions which possibly may be helpful to the author, and to others who may be stimulated by his labours to undertake work of a similar nature.

If we return to the author's summary we see at once that the vital deduction is that contained in the secondary paragraph, viz., that

of the twelve strains studied in the human patient, four, i.e., 33·3 per cent., were non-transmissible cyclically by laboratory-bred *G. palpalis*. As the whole of the remainder of the argument is based on this conclusion, it is of importance to examine the observations, and consider whether we can satisfy our intelligences that they are of such a nature as to justify the conclusion reached by the author. It has long been recognized that, in striking contrast to what occurs when suitable anopheles are fed, under optimum conditions, on blood containing numerous malaria gametocytes, never more than a comparatively small percentage of tsetse, fed on a case of sleeping sickness, become infected and show invasion of their salivary glands with metacyclic trypanosomes. This fact, so it appears to the reviewer, must be kept prominently in mind when considering work of the kind Dr. Duke has undertaken. Why only a very small proportion of tsetse become infected or infective we do not know. So far alteration of the conditions of experiment has not succeeded in increasing the proportion to any material extent. Whatever be the cause the reviewer cannot avoid the conjecture that it lies in the flies themselves: some are susceptible to infection at the time they are fed and others apparently are not.

Let us now consider the data collected by Dr. Duke which the reviewer has summarized in the table given above. If we consider two extreme cases, we see, for example, that with Strain IX, 6·9 per cent. of the 158 flies fed were found to have salivary gland infections; and that with Strain VIII, none of the 183 flies fed developed salivary gland infections. From this Duke concludes that the former strain is readily transmissible and the latter non-transmissible. No one will doubt the figures or the careful manner in which they were obtained, but the question which troubles the reviewer is whether they will allow of the conclusion which Duke has reached. Are the figures large enough? Were sufficient flies used in each of these experiments having regard to the fact that under no known conditions of experiment do more than 5-8 per cent. ever become infective? If at the same time a whole series of batches of 158 flies had been fed on Strain IX would we always have obtained 6·9 per cent. of salivary gland infections, and never 1 per cent. or 0 per cent.; and similarly if a whole series of batches of 183 flies had been fed on Strain VIII would the result always have been 0 per cent. of infection, and never 1 per cent. or even 6·9 per cent.? What is the error which must be allowed for in comparing the results of observations based upon figures such as those furnished in the table? If we apply the ordinary tests, we find that the error is such that it is doubtful whether the figures have any comparative value.

This discussion must not be taken to mean that the reviewer considers the work in question as valueless—far from it—but that he does not feel able to accept Duke's conclusions from the data which he has so far accumulated. In the reviewer's opinion the matter must at present be regarded as non-proven. It is only fair to point out that Duke himself seems to have some doubts on the matter, for in Section V he writes—"It may be objected that the conclusions drawn in these papers are not warranted by the evidence, and that the number of flies is too small."

The next portion of Duke's report relates to the behaviour of some of these strains in ruminants and the changes they undergo during a sojourn in animals other than man. It was not found possible to introduce all of the nineteen strains into ruminants, and some of them were much more carefully studied than others. The sheep and goats

used in the experiments came from a fly-free area, and were all carefully examined before use. There appears to be little difference in the susceptibility of sheep and goats to *T. gambiense*. Occasionally, these animals may resist infection with *T. gambiense* when bitten by infected flies. On two occasions sheep failed to become infected when bitten by flies infected with *T. gambiense* and on two occasions the same thing happened with goats. The possibility of domestic ruminants acting as reservoirs for *T. gambiense* has been recognized for a long time. KLEINE's experiments on this subject for 1911 and 1913 are discussed in some detail. From these experiments it appears that monkeys were more readily infected than sheep and goats, relatively few of these animals becoming infected. Duke in commenting on this fact states that it is quite definite that KLEINE's monkeys were in certain circumstances more susceptible to *T. gambiense* than were his sheep and goats. Whether this phenomenon depended on the strain or on the animal itself it is impossible to determine. Duke also states that he is sure from recent experiences at Entebbe that some of KLEINE's strains must have been non-transmissible strains of *T. gambiense*.

The author then proceeds to discuss the later history of some of the 19 human strains referred to in the previous section of his work. The transmission experiments and the index tables relating to the later passages of these strains are presented in the same way. All the passages were made by cyclically laboratory fed *G. palpalis*, except where the contrary is expressly stated. The results are set forth in a series of tables and in the case of each strain the transmissibility index of the strain when it was originally obtained is compared with its transmissibility index of the later passages through various animals, i.e., monkey, sheep, and goat.

The following summary is given :—

"These experiments must speak for themselves. The inferences we are tempted to draw from them at this stage are :

"1. That, as a general rule, the transmissibility of a strain of *T. gambiense* diminishes when the strain is introduced into a sheep or goat.

"2. That after some months' sojourn in these animals, *T. gambiense* loses its transmissibility altogether.

"3. That a strain of *T. gambiense* may lose its transmissibility quite suddenly on being transferred from one host to another by cyclically infected *G. palpalis*.

"4. That, in the three patients whose strains were transmitted by tsetse fed directly on the patient the trypanosome had a higher Transmissibility Index in man himself than in the animals infected from him by cyclical transmission.

"5. That it is improbable that sheep and goats play any important part as a reservoir of this trypanosome, but a final opinion on this important point must be reserved. According to these experiments, calves are a negligible factor in this respect."

[The comment made in reference to the previous section applies equally here.]

The next section records certain transmission experiments with strains of *T. rhodesiense* recently isolated from man. Four strains are dealt with—three from the Mwanza-Ikoma infected area in Tanganyika, and one from the Belgian Congo. Information regarding the transmission experiments made with these strains and their transmissibility index is set forth in tables.

In discussing the results of his work, Duke points out that the relation between *T. gambiense* and *T. rhodesiense* is one of the questions

that the Commission had to investigate. KLEINE's conclusions are interesting and far-reaching and indicate the urgent necessity for experimental work with tsetse of the *G. morsitans* type to determine whether *T. gambiense* when transmitted by game-tsetses, after a long period of time, acquires the characters of *T. brucei*. Duke records that for some years he has advanced the view that the differences between these two trypanosomes are to be explained by the differences which exist between their vertebrate host, i.e., man and game. It is possible, however, that the fly also exerts an influence on the trypanosome it carries. Duke makes it clear that he differs from KLEINE in regard to *T. brucei*. KLEINE considers *T. brucei* to be entirely different from the two human trypanosomes which he considers to be identical. Duke also believes that the differences between *T. gambiense* and *T. rhodesiense* are differences due to environment, but he agrees with BRUCE, and with the reviewer, that *T. rhodesiense* and *T. brucei* are even more nearly related to one another. *T. brucei* and *T. rhodesiense* are the same species; and *T. rhodesiense* is the name given to strains of *T. brucei* that can utilize man as a host. Wherever game tsetse are thrown in close biological contact with man there *T. rhodesiense* will be found if looked for. The majority of the strains of *T. brucei* are incapable of utilizing man; in the same way a number of strains of *T. congolense* cannot infect dogs or monkeys. In the former case, the more enterprising strains have earned the distinctive name of *T. rhodesiense*, and in the latter the more conservative variety is known as *T. nanum*. The essential point of this view is that the selection is exercised by the trypanosome rather than by the mammalian host.

Viewed from this angle the much discussed experiment of TAUTE does not show that 129 natives were resistant to the species of trypanosome known as *T. brucei*, but that the six particular strains of *T. brucei*, which TAUTE took from horses and mules, could not infect man.

[The whole subject is one of great theoretical, and, undoubtedly also, of practical and epidemiological, interest. For reasons previously stated the reviewer is compelled to confess that he does not think that Dr. Duke has yet proved his point. It seems unfortunate that Duke should have used *T. congolense* to support his contention that "selection is exercised by the trypanosome rather than by the mammalian host." What is the evidence that "a number of strains of *T. congolense* (*T. nanum*) cannot infect dogs or monkeys"? The mind of the reviewer goes back to certain experiments performed by BLACKLOCK and himself in 1913. From a horse naturally infected in the Gambia with *T. congolense* eleven animals were inoculated with the following results: Of 2 goats 1 became infected and 1 did not; of 3 rabbits 2 became infected and 1 did not; of 4 guineapigs 3 became infected and 1 did not; and of 2 rats neither became infected. In this case there seems to be no doubt that the selection was exercised by the mammalian host.]

The third section of Duke's report consists of an investigation of the transmissibility by laboratory-bred *G. palpalis* of eight strains of polymorphic trypanosomes from mammals other than man. These strains were:—

"(a) A trypanosome from East Africa sent to me from Kenya by Mr. Montgomery, Veterinary Pathologist, Nairobi, and described in 1912.

"(b) A strain of the Lake Victoria polymorphic organism recovered from wild-fly on the mainland shore in 1920.

"(c) A similar strain isolated from a situtunga antelope shot on Damba Island in 1920.

"(d) A wild-fly strain from the *G. swynnertoni* zone near Mwanza, isolated in 1922.

"XXIII. A strain isolated from a Damba antelope in September 1926.

"XXIV. A strain of *T. brucei* sent to the Laboratory in February 1926 by Professor Kleine.

"XXV. A polymorphic organism found by Captain Hall, Veterinary Pathologist, Uganda, in cattle from the Gomba county, in Uganda.

"XXVI. A strain of *T. brucei* from a dog infected in a *G. morsitans* area near Mbarara, in the Western Province of Uganda."

The general conclusion reached is that "these experiments convey an impression—it amounts to nothing more—that the game trypanosomes from *G. palpalis* areas have, on the whole, a low transmissibility index; lower indeed than that possessed by strains derived from game tsetse areas."

The fourth section records further experiments on the effect of direct transmission on an antelope trypanosome of the polymorphic group. The strain was obtained from the blood of a situtunga antelope shot on Damba Island in February, 1924. The blood was inoculated into a monkey and the strain passed through monkeys by the syringe until the 34th passage, when a guineapig was introduced. By this time the strain had lost its transmissibility. Details of the plan of upkeep of the strain and of the transmission experiments are given in tables.

In the fifth section the transmissibility of trypanosomes by glossina is discussed, together with some reflections on the spread of human trypanosomiasis. The special object of the enquiry is to attempt to explain the way in which human trypanosomiasis spreads, and attention is specially directed to the relation of *T. gambiense* and *T. rhodesiense* to the insect intermediary. The author points out that when once a trypanosome has lost the power of infecting the glands of glossina, it has only direct transmission between it and extinction on the death of its host. He refers briefly on what he has previously written on the possibility of transmission of human trypanosomiasis by the direct method by tsetse. As the result of recent work, he is inclined to modify, but not to abandon, his original views on direct transmission. Experiment has shown that this method may function for a long time without producing any effects on the strain, and conditions in which prolonged direct transmission can occur in nature must be rare. It must, therefore, still be admitted that direct transmission is one of the factors which may affect the constitution of a trypanosome in its natural surroundings. There is no evidence that a tsetse cyclically infected by a trypanosome is infective until the metacyclic forms have appeared in the "anterior station." Referring to the observations of KINGHORN, YORKE, and LLOYD that positive results may be obtained by injecting the gut contents of certain flies infected with *T. rhodesiense*, Duke states that even if this result be not explained by leakage from the glands, the combined experience of those who have worked on the subject shows that trypanosomes developing in glossina cannot be transmitted by the fly during the act of feeding, unless the salivary glands of the insect contain the metacyclic forms. [YORKE and MACFIE, 1924, found sporozoites amongst the blood in the stomach and in the ventral oesophageal diverticulum of *A. maculipennis* an hour or two after feeding. These

must have had their origin in salivary secretion, which, after being discharged into the wound, had been withdrawn with the blood into the alimentary canal. It is probable that the observations of KINGHORN, YORKE, and LLOYD, are to be explained on similar grounds.] Human trypanosomiasis never spreads in the absence of glossina, and glossina is the only insect in which these trypanosomes are known to develop cyclically. From a human point of view, therefore, the power of these trypanosomes to develop cyclically in tsetse is of supreme importance, and the transmissibility of the strain is one of its most significant attributes. The virulence of the strain appears to be entirely independent of its transmissibility. The manner in which the trypanosome loses its power to develop in tsetse is discussed. The capacity to invade the salivary glands disappears first. The final stage consists in the complete loss of power to develop even in the gut.

Passing to the various factors which may influence the transmissibility of the trypanosome, Duke considers four possible explanations. The determining cause may be (1) the Fly; (2) the Climate; (3) the Vertebrate, and (4) the Trypanosome itself.

(1) *The Fly*.—Miss ROBERTSON concluded that the physiological variations of individual flies played little or no part in determining the percentage of flies which are infected by different strains of trypanosomes. She decided that the explanation lay rather in the properties of the trypanosomes taken up by tsetse. KLEINE reached the same conclusion, and Duke's own experiments likewise lead him to support this conclusion, because :—

(a) Different strains possess different degrees of transmissibility when first isolated from their natural host.

(b) Non-transmissible strains are consistently non-transmissible, no matter how many tsetse are employed in their investigation. [This fundamental statement does not in the reviewer's opinion rest on any solid foundation of proof.]

(c) The extent to which flies become infected when fed on an animal varies according to the day or days on which they are fed.

(d) The diet of the fly appears to exert no effect on the development of the flagellates, nor does their presence appear to harm the fly in any way.

(2) *The Climate*.—ROUBAUD and BAGSHAWE both put forward the suggestion that climatic conditions may affect the transmission of trypanosomes by tsetse. ROUBAUD's results, however, are explicable on the assumption that he was working with non-transmissible strains, and KLEINE's experiments are also explicable on the same basis. The observations of KINGHORN, YORKE, and LLOYD on the effects of climatic conditions on the cyclical transmission of a trypanosome by tsetse are referred to; but it is considered unlikely that seasonal conditions in any given area will be sufficiently pronounced to produce a similar effect to those obtained in their experiments.

(3) *The Host*.—It can be affirmed with some confidence that of the mammalian hosts ordinarily available to the trypanosome in nature, no species exerts a definite and immediate inhibitory effect on the transmissibility of the parasite by tsetse; but more than this cannot be said.

4. *The Trypanosome*.—As a result of the experience of previous workers, Duke was led to the conclusion that the transmissibility of a trypanosome by glossina is a function inherent in the trypanosome itself. The work of ROUBAUD and KLEINE suggesting the existence of non-transmissible strains is briefly referred to, as is also that of REICHENOW (1921), who reported the existence of non-transmissible strains of *T. gambiense* in man himself. REICHENOW found that flies fed upon "old cases" of human trypanosomiasis did not develop infections in the salivary glands. This was not Duke's experience, as in all his advanced cases the trypanosomes were transmissible.

The fifth section consists of notes on the bionomics of the polymorphic trypanosomes on Damba Island.

Following the report are a number of appendices.

Appendix A describes an investigation of the action of "Bayer 205" on *T. gambiense* developing in *G. palpalis*, and shows that the drug apparently exerts no sterilizing effect on tsetse infected with *T. gambiense*.

Appendix B. Experiments here described indicate that it is immaterial to a young laboratory-bred fly whether it feeds before its first infecting feed or not.

Appendix C deals with the nomenclature of human trypanosomiasis in native African languages and its possible bearing on the antiquity of the disease.

Appendix D consists of a few remarks concerning the resistance of *T. gambiense* to arsenic.

Appendix E describes a few experiments dealing with the possible chemotactic influence of the salivary glands of glossina on the development of the polymorphic trypanosomes in tsetse.

III. Reports. By G. LAVIER. [pp. 117-141. With 3 figs.]

The first section of Lavier's contribution deals with an attempt to infect baboons with *T. rhodesiense*. The natural resistance of these animals is well known and the author endeavoured to lower it by infecting them with various helminths, *Treponema duttoni* and tuberculosis. The attempt to break down the immunity by such methods, however, ended in failure, as did also an attempt to infect them by suboccipital puncture.

The next section is concerned with a morphological study of isolated strains at Entebbe laboratory. The main results of this work have appeared elsewhere and have already been noticed in this *Bulletin*.

IV. Reports. By M. MAXIMO PRATES. [pp. 143-244. With 80 figs.]

After indulging in some brief notes on the microscopic diagnosis of trypanosomiasis, the author passes to a consideration of the posterior nuclear forms of polymorphic trypanosomes. He states that the percentage of posterior-nuclear forms in recently isolated *T. gambiense* is manifestly lower than in recently isolated *T. rhodesiense* infections.

The third section deals with the Gaté-Papacostas reaction (formol-gel test) in the diagnosis of trypanosomiasis. The following are the conclusions :—

"1. As there exist in tropical regions, in addition to trypanosomiasis, various other diseases of man or animals which also give a positive formol-gel reaction, the test alone cannot be relied on in the diagnosis of any one of these affections.

"2. When formol jellyfication is *negative* in a person or animal suffering from a chronic disease affecting the general health, it is unlikely to be a case of trypanosomiasis or any of the other chronic affections producing more or less rapid serum jellyfication such as syphilis, yaws, tuberculosis, leprosy, malaria, kala-azar, East Coast fever, etc.

"3. In the absence of more certain data, the formol-gel test may furnish certain presumptive evidence of assistance in the diagnosis of advanced chronic diseases about which information is available as to the positive or negative formol-gel reactions generally associated therewith.

"4. Human and animal trypanosomiasis and various other chronic tropical affections give negative formol-gel reactions only in exceptional cases, and this generally at the beginning of the disease.

"5. The drugs which act most effectively on the disease affecting the organism from which the blood-serum has been taken exercise the greatest influence on formol-jellyfication, inasmuch as reactions which were previously positive become negative or at least greatly retarded.

"6. I did not find that the serum of persons or animals infected with *T. gambiense*, *brucei* or *rhodesiense* to which had been added *in vitro* "Bayer 205" or tryparsamide showed any specific characteristics that could serve to differentiate between these trypanosomes.

"7. The formol jellyfication of the serum appears to depend not so much on the intensity of the infection or infestation, as evidenced by the number of virulent micro-organisms found, as on the gravity of the disease as determined by general symptoms, both objective and subjective, affecting the animal's general state of health.

"8. Employed in clinical examination (examination of candidates for sickness insurance) or the examination of stock, a positive formol-gel reaction may serve to indicate the existence of certain chronic diseases."

The fourth section records attempts to culture polymorphic trypanosomes. The following summary and conclusions are given:—

"1. In Ponselle's medium, in which Ponselle cultivated different pathogenic trypanosomes (*brucei*, *pecaudi*, *rhodesiense* and *dimorphon*) with absolutely constant results, "all the tubes inoculated giving abundant growth both in original cultures and in subcultures, which can be carried on indefinitely," I obtained cultures of *T. gambiense*, *T. rhodesiense* and *T. brucei* and also of the Damba-antelope trypanosomes, though with a lower percentage of positive results.

"2. I cultivated all these trypanosomes in the same Ponselle medium, with the same sodium-chloride concentration.

"3. I found no morphological difference between the various polymorphic trypanosomes at any stage of the cultures: all, no matter what the medium, exhibited the recognized morphology found in the gut of glossinae. Nor did I observe any metacyclic or blood forms.

"4. Rabbit serum may be replaced by monkey serum in Ponselle's media for the cultivation of the pathogenic trypanosomes of African mammals.

"5. When inactivating Ponselle's media for the cultivation of pathogenic trypanosomes in the higher mammals, the temperature may be allowed to go up to from 70° to 75° (this is even desirable) when the medium assumes consistency of a viscous jelly.

"6. I inoculated *Cercopithecus* monkeys and white rats with cultures containing an abundance of trypanosome like flagellates—15, 30, 40, 45, 50, 60 and 65-day cultures—but did not succeed in infecting any of the animals. I repeated several inoculations, after keeping the trypanosome cultures in an incubator at 37° for 24 hours; the results, unlike those obtained by Nöeller, were also negative.

"7. Some of the animals which had been given repeated injections of cultures at different stages of development were subsequently inoculated with sanguicolous trypanosomes of the same species, and did not exhibit any appreciable degree of immunity.

"8. I applied various boxes of "fresh" glossinae to monkeys inoculated with cultures, and the flies which sucked them did not become infected.

"9. The existence of bacteria in Ponselle's media and the cultivation of the polymorphic trypanosomes of African mammals appear to be incompatible; trypanosomes always disappear from contaminated cultures after a few days.

"10. I have tried to cultivate the blood and cerebro-spinal fluid containing occasional *gambiense* trypanosomes, in order to see if the method could be used for the diagnosis of this form of trypanosomiasis. All the cultures were negative in cases in which microscopic diagnosis had been difficult and the percentage of positive cultures was so low even when the microscopic diagnosis had been easy, that, unless the cultural method should give better results in the hands of some other investigator very slight assistance—if, indeed, any—in the diagnosis of the trypanosomiasis in question can be looked for.

"11. I found no confirmation of Ponselle's suggestion that the differences in the osmotic pressure required for cultures of the various pathogenic trypanosomes may supply useful indications as to the receptivity of different tsetse-flies for the various species of trypanosomes. On the one hand, all the trypanosomes that I cultivated (*brucei*, *gambiense* and *rhodesiense* and those of the Damba antelope) completed the same evolutionary cycle in *Glossina palpalis*, at the Entebbe Laboratory (Dr. Duke's experiments); on the other hand, I cultivated all these trypanosomes in the same Ponselle medium, prepared with no matter which of the sodium-chloride concentrations.

"Ponselle himself described *T. brucei* and *T. rhodesiense* (both transmitted in nature by the same glossinae) as demanding very different osmotic pressures (0.3 per cent. for *T. brucei* and 0.8 per cent. for *T. rhodesiense*) and *T. rhodesiense* and *dimorphon*, on the contrary (transmitted by different flies) as requiring the same pressure (0.8 per cent.)."

The fifth section describes in great detail experiments devised with the object of applying the precipitin test for the recognition of the blood found in the alimentary canal of *Glossina*. The conclusions reached from this work are as follows:—

"1. When applying the precipitin test to blood found in the alimentary canal of *G. palpalis* caught on the banks of Lake Victoria, near the Entebbe Laboratory, I found, out of 2,150 tsetse-flies dissected, 186 (8.6 per cent.) containing blood. With these 186 flies I obtained 43 (23 per cent.) positive precipitin reactions. 6 with anti-human serum (out of 45 reactions), 21 with anti-monitor (lizard) serum (119 reactions), 6 with anti-crocodile serum (31 reactions), 4 with anti-hippopotamus serum (28 reactions), 2 with anti-ruminant serum (19 reactions), and 4 doubtful reactions, one with anti-ruminant serum, a second with anti-bushbuck, a third with anti-Situtunga (antelope) serum, and, lastly, a fourth with an anti-serum prepared with hen's blood and the blood of various water-birds.

"The results would presumably not be the same in another fly-belt, where the fauna would be different from those studied at Entebbe. If, for example, the anti-Situtunga serum were applied to the blood in the gut of tsetse-flies on the islands in Lake Victoria, where the blood of this antelope constitutes the chief food of *G. palpalis*, I am convinced that a higher number of positive precipitin reactions would be obtained than I got with the flies caught near the Entebbe Laboratory.

"2. There is reason to believe that, whenever they have any choice, tsetse-flies show a preference for certain animals; but my experiments on the precipitin test and the experimental application of wild and laboratory-bred glossinae to numbers of zoological species, whose blood they finally sucked more or less readily, point to the fact that tsetse-flies, essentially blood-sucking insects, can feed on the blood of any animals

that are found habitually in or may happen to visit places in which they themselves find a suitable environment for living and breeding (temperature, humidity, shade, nature of the soil, etc.).

"3. The first observers to study the precipitin test noted that the action of pepsin, and particularly of trypsin, had a marked effect on the intensity of precipitin reactions.

"Hektoen, Fantus and Portis (1919) proved that extracts of the faeces of healthy persons living on an unrestricted meat diet rarely gave positive reactions with anti-sera prepared with the antigen of the animals (ox, goat, sheep, hen, etc.) on which man generally feeds, showing that, ordinarily, foreign proteins which enter the stomach are not found in the same state in the faeces.

"When engaged in comparative tests with sera with a high precipitin content and homologous antigens, before and after digestive action in the glossinae, I myself found that digestion has a very marked effect on the intensity of the precipitin reaction. With blood containing red cells clearly recognisable under the microscope, taken from glossinae experimentally fed on specific animals, I often failed to obtain positive reactions, though I had employed sufficiently active homologous anti-sera, producing well-marked positive reactions in the control tubes.

"4. In practice, the fly-boys only catch tsetse-flies that have come out for the purpose of biting them, and these do not contain any blood but are, on the contrary, in search of it. Only in 8.6 per cent. of the flies caught did I find any vestiges of blood still recognisable on microscopic examination. This blood, however, was so modified by the digestive ferments in the fly that I only obtained 2 per cent. feebly positive precipitin reactions, despite the special technical precautions I took to overcome the difficulties encountered and to make sure of the modest results obtained with specimens of blood less modified by digestive action in the glossinae. The few well-marked *positive* reactions were obtained with anti-human serum, probably because the blood in the glossinae had been quite recently sucked from the fly-boys themselves, without the flies' digestive ferments having had time to modify its antigenic properties to any great extent.

"The expedients that I adopted to overcome the various difficulties I encountered constitute the only original part of my contribution to this work, which I have been obliged to describe at greater length than I could have wished.

"5. The complement fixation test, in a laboratory suitably equipped for Wassermann reactions, should furnish more fruitful results than the precipitin test in identifying the blood found in the alimentary tract of glossinae."

The sixth section contains an account of haemoparasites found in Glossina. This study was undertaken with a view to the identification of the blood in their intestine.

The last section of Prates' report is a general account of the organization of experimental work on Glossina at the Entebbe laboratory. It is illustrated by numerous photographs.

V. Pathologico-Anatomical and Serological Observations on the Trypanosomiasis. By M. PERUZZI. [pp. 245-324. With 24 figs. & 2 coloured pls.]

The first of this very interesting and important series of articles deals with the pathogenic potency of some trypanosomes. The various pathological lesions found in a considerable number of infected monkeys are described in great detail. The following are the general conclusions reached :—

"The post-mortem and histological study of fifty-three monkeys, of which forty-three were infected with recently isolated strains of trypano-

some of human and animal origin, has brought to light the susceptibility of these monkeys (*Cercopithecus* sp.) to present the most diverse manifestations of trypanosomiasis, and the relation between the specific lesions and the extraneous complications (malaria, filariasis, helminthiasis, cerebral porosis, bacterial infections).

"The variety of the morbid anatomical lesions thus provided very favourable conditions for the comparative study of the strains used and their pathogenic connections. The results of this study enable us to distinguish three pathogenic types :

"I. Chronic manifestations, with few trypanosomes, approaching in a few weeks (four to eight) sclerotic and infiltrative lesions of the haematopoietic organs, characteristic meningo-encephalitis, sclerosis of the myocardium and cachectic phenomena, predisposing the monkeys to extraneous complications.

"This group characterises the pathogenic action of human trypanosomes of the *G. palpalis* regions.

"II. Rapid manifestations, with numerous trypanosomes, approaching in a few weeks (two to four) terminal lesions, characterised by hyperplastic and haemorrhagic phenomena in the haematopoietic organs, by true specific myocarditis, serositis and nephritis, by the early passage of the parasites into the cerebro-spinal fluid and lesions in the choroid plexuses.

"This group characterises the pathogenic action of the human and animal trypanosomes of the *G. morsitans* and *G. swynnertoni* regions.

"III. Irregular manifestations of an intermediary type, tending to reach in a few weeks (eight to ten), or even some months (eight to fourteen), lesions of the first or second type, and most frequently to chronic lesions associated with rapid terminal lesions.

"This group characterises the pathogenic action of trypanosomes of animal origin, of *G. palpalis* regions (Damba Island).

"Nevertheless, it must be noticed that there are some very great differences, and numerous important exceptions, due either to individual resistance, or to pathogenic potency, which is extremely variable in recently isolated strains; these differences prevent any grouping of some border-line forms among the most rapid of the first group and the slowest of the second. Some cases, from reputed *G. palpalis* regions, suggest the existence of other glossinae, or that the patients had contracted the disease elsewhere; and the pathogenic manifestations in monkeys sometimes singularly agree with the results of morphological research.

"The morbid anatomical process was always the same, with local manifestations more or less important, according to the number of parasites, which all showed their tendency to localize themselves in the interstitial spaces of the tissues and in the serous-membrane fluids.

"The most considerable localisations determine, in the first stage, exudative infiltrations of polynuclears and lymphocytes; afterwards, the mononuclears and macrophages are added, while the capillaries are the seat of serious trouble (oedema, haemorrhage by diapedesis, endothelial proliferation). These elements, as well as the parasites, are gradually absorbed by the lymphatic ducts; some plasma cells and some lymphocytoid and polymorphous histiocytes persist a long time in the form of abundant interstitial infiltrations, until the complete development of elements capable of fibroblastic activity.

"This process has all the characteristics of granulomatous inflammation and it may attain to definite histological transformations in the form of cirrhoses.

"The most remarkable manifestations affect the myocardium, the serosae, and the kidneys. More moderate infiltrative changes may affect the liver, the suprarenals, the meninges and the vascular terminations of the nerve centres, the genital organs, the salivary glands, the alimentary canal and present local symptoms that are sometimes of great importance.

"Small perivascular infiltrations are also demonstrable in almost all the tissues of the organism, owing to the ubiquity of the trypanosomes in the interstitial spaces rather than in the blood.

"Hyperplastic, haemorrhagic, and sclerotic changes are manifested in the haematopoietic organs; they are due to their cathaeretic function, as well as to the direct action of the living parasites.

"The results of these post-mortems enable one to explain the pathogenic power of the trypanosomes studied; one can also say that they have brought to light the most faithful experimental reproduction of human lesions obtained till now and that they have called attention to new questions which must be carefully studied in man, such as serositis and cardiopathy."

The next section describes the trypanosomes in the lesions, massive localisations and cellular invasions. The following is the summary:—

"At the sight of lesions, the trypanosomes have generally the same form as in blood drawn off from the periphery; but in massive localisations they show a very accentuated polymorphism, which seems related to their power of invasion.

"In certain tissues (myocardium, kidney, suprarenal), one can find typical trypanosomes, or leishmanoid forms. These manifestations of cellular invasion have characteristics which show accidental relationships with the protoplasm, changed or vacuolised by a regressive process, and do not show the phases of an intra-cellular cyclical evolution typical of other trypanosomes. It is a case of manifestations of malignity which almost always characterises the trypanosomes of *rhodesiense* type and very often those of the Damba-Island antelopes.

"The most extensive localisations in the monkey were found in the myocardium, where they caused myocarditis; in the choroid plexuses which favour early penetration into the cerebro-spinal fluid, and into the fluids of the serous membranes, where the trypanosomes were to be found even when their presence in the blood had not been proved. The trypanosomes are easily visible in tissues stained with haematoxylin-eosin, provided that the post-mortem phenomena are not advanced and that bacterial infections have not produced complications."

The third section contains a description of trypanosomal myocarditis. The work is summarized as follows:—

"Trypanosomal myocarditis frequently causes death in inoculated monkeys.

"The lesions are due to massive deposits of trypanosomes, which multiply in the myocardium, external to the vessels.

"They become manifest in the first stages by infiltrations which are rich in macrophages, in mono- and polynuclear cells and in leucocytes. In advanced and chronic conditions one finds infiltrations of polymorphic, lymphocytic and plasma cells, and confluent foci of fibrosis.

"These forms of myocarditis are always associated with exudative pericarditis. The gravest and most frequent forms are due to trypanosomes of human or animal origin conveyed by *G. morsitans* and kindred species and to trypanosomes of animal origin conveyed by *G. palpalis*.

"Less acute forms are found in infections caused by trypanosomes of human origin conveyed by *G. palpalis*.

"These latter forms correspond without doubt to the human lesions described in the earliest publications on the pathological anatomy of sleeping-sickness, ascribed to the *gambiense* strain.

"In view of the cardiac disturbances, sudden deaths and premature fatal issue of the malady noted in human infections due to strains of *rhodesiense*, it is extremely probable that in these forms the cardiac changes are very severe and sometimes more important than the changes in the nervous system.

"Researches on this subject would surely yield interesting results."

The fourth section describes the changes found in the choroid plexuses and the entry of trypanosomes into the cerebro-spinal fluid. It is stated that :—

"The choroid plexuses are the site of early extravascular deposits of trypanosomes of human and animal origin from *G. morsitans* and *G. swynnertoni*.

"These penetrate into the cerebro-spinal fluid in large numbers, but are rapidly destroyed, not finding conditions favourable to their survival.

"The degree of these lesions is not proportional to the vascular lesions of the meninges and of the nervous tissue. The cerebro-spinal fluid is a defensive mechanism against the invasion of trypanosomes until its albuminoid content is raised. It contains demonstrable trypanosomes when the phenomena of meningo encephalitis are definitely established. This happens particularly, but not exclusively, in advanced forms of chronic trypanosomal infections, caused by strains of human or animal origin from *G. palpalis*, and also when the changes in the cerebro-spinal fluid are very pronounced."

In the fifth section the origin and histological relation of the morula cells in trypanosomal meningo-encephalitis is discussed. The author concludes that :—

"Morular cells are cells with fuchsinophile hyaline globules analogous to cells found in granulomata. They have, perhaps, in trypanosomal encephalitis a multiple origin, but the features and relationships they present in the different phases of their evolution indicate neuroglia as their most frequent origin.

"The transformation of satellites of the nerve cells into morular cells determines grave changes in the nerve cells, particularly in the grey matter of the bulb, the protuberance and the basal ganglia."

In the next section a condition of cerebral filariasis is described in five monkeys infected with trypanosomal meningo-encephalitis. The following is the summary :—

"A cerebral and bulbar localisation of adult filariae was observed in five monkeys (*Cercopithecus*) infected with vascular lesions and alterations in the cerebro spinal fluid due to trypanosomiasis. The percentage of this localisation, the relation between the quantity of parasites and the duration of the trypanosomiasis, and the results of examination of the cerebro-spinal fluid at different periods would lead us to suspect that the localisation took place during the captivity of these monkeys and in the course of the trypanosomiasis, caused or facilitated by the alterations in the cerebro-spinal fluid.

"No pathogenic rôle can for the moment be assigned to the cerebral filariasis so far as concerns the local lesions, but grave bulbar phenomena and apparent death occurred in a case where the parasites were very numerous."

The last section is concerned with the question of immunity and the protective action of baboon serum. As the result of his experiments, the following conclusions were reached :—

"A strain of *T. rhodesiense* behaved differently towards treatment with baboon serum in two guineapigs of the same size, inoculated at the same time and with the same quantity of virus at the 2nd passage ; a further difference appeared when this strain, which in one guineapig appeared to be naturally serum-resistant, was transferred to another.

"Serum-resistance, then, would appear to be a property of the host rather than of the trypanosome.

"A trypanocidal action *in vitro* is manifest when baboon serum is in the presence of hepatic tissue taken from still-living infected animals ; and in

these circumstances is more rapid and intense than when we are dealing with infected animals which have been previously treated with the same serum.

"The numerous attempts to transmit to cynocephalics a strain of *T. rhodesiense* serum-resistant in the guinea-pig, a strain of *T. brucei* derived directly from a naturally infected dog, and a trypanosome from *G. palpalis* derived from a Damba antelope gave negative results. Inoculations of exudates very rich in living trypanosomes were made into the serous membranes and into the myocardium, where trypanosomes develop most easily in predisposed animals.

"Nevertheless, the survival of trypanosomes for more than twenty-four hours in the baboon, the local reactions observable in the subcutaneous tissue and in the *tunica vaginalis* together with phenomena exactly similar to those in predisposed animals, as also the differences found according to the site of inoculation, show that the limits of immunity have been reached.

"Further researches on serum-resistance of human strains at the first passage, and on the infection of cynocephalics by direct or cyclical transmission starting from man, are still necessary."

Peruzzi's papers are illustrated by a number of micro-photographs and two beautiful coloured plates.

VI. Epidemiology of Sleeping-Sickness in the *G. palpalis* and *T. gambiense* Areas. [pp. 325-388.]

This section consists of the following six papers which deal mainly with the epidemiology of sleeping sickness in *G. palpalis* and *T. gambiense* areas:—

1. *Sleeping Sickness in the Semliki Valley.* By L. VAN HOOF. [pp. 329-345.]

The author and Dr. LAVIER left Entebbe on December 7th, 1926, to visit the foci of human trypanosomiasis which in the last few years has decimated the southern half of the fertile valley of the Semliki. The few weeks at their disposal were too short to allow the carrying out of a regular epidemiological enquiry, and consequently the investigation was limited to an examination of certain places where infection was epidemic, and to an attempt to ascertain the cause of this state of affairs and to contrast these areas with zones where endemicity is low.

The following are the general considerations and conclusions:—

"1. *Abundance and Distribution of Glossinae.*—Although not very numerous, *palpalis* are found on all the rivers, lakes, etc., their habitat extending without interruption as far as the areas of Irumu, the Chari-Ituri river, the Ituri forest, Lake Edward and Lake George, Katwe, Bamba and Wasa, east of Ruwenzori.

"2. *Density of Population and Natural Resistance.*—Conditions have changed since the evacuation of the valley, where only isolated groups are now left. On the slopes, however, there are thickly populated settlements over which it is difficult to exercise supervision and, chiefly towards the frontier, the natives, who are intractable and often insubordinate, move about on the slightest pretext from one *palpalis* zone to another. There, wherever the compact groups of Bahimas are settled, a dense population is to be found round certain definite tsetse breeding-grounds. Their natural power of resistance, so far as it counts, is comparatively low in regard to all forms of infection, despite the fertility of the soil and their numerous and plentiful crops. A mixture of very different races is found, from the Bahimas to the forest pygmies. Their standards of morality and intelligence are below the average:

"3. *Circumstances which favour Close Contact between Man and Glossinae.*—(a) Dwellings in the vicinity of glossinae breeding-places. Notable examples, namely, Old Beni and the Mission, have already been quoted, in which the natives and even the Europeans are exposed every day.

"(b) Existence of breeding-grounds of glossinae which feed exclusively on man. There are springs and streams where the natives go to fetch water all day long and where neither reptiles nor game exist to divert the fly. These conditions already exist in some of the new sites (for example, Bungulu) to which settlements have been moved.

"(c) Native industries and occupations. Reference was made to these above, the most important being fishing, canoe building, and the cultivation of plantations near the rivers; all are prohibited by the Administration, but are none the less practised clandestinely. To these must be added the following: the house-to-house trading in salt; cattle-breeding in the plain; trade with neighbouring territories; exchanges of labour; the purchase of women between Bwamba and the Banande; the traffic in hemp; the exchange and migration of cattle between the Bahimas of Molekera and those of Bwengo, and perhaps of many other parts of Ankole; administrative, scientific and also hunting expeditions, the native porters being obliged to enter the old focus in the plain, often without any provision for medical supervision when they are exposed to infection.

"4. *The Virulence of the Trypanosome*, so far as it can be estimated from the clinical evolution of the disease, the index of mortality, the efficacy of the regulation treatment and, in certain cases, natural resistance to atoxyl.

"Other factors, and most important ones, are still uncertain and would have required considerable additional research both on the spot and in the laboratory. We do not possess data to show the degree of infectiousness of the virus or the "index of transmissibility," which Dr. H. L. Duke might have established at Entebbe, if it had been possible to bring back a sufficient number of strains. Lastly, we have only very vague ideas as to the number of virus-carriers in this area, where chemical prophylaxis has been employed for many years with so little success.

"From the purely practical standpoint, however, I feel justified in drawing the following conclusions:—

"1. The endemic in the Semliki area is serious, the virus may be described as of average strength and to-day, as in the past, shows a tendency to spread, creating fresh foci in the *palpalis* distribution area.

"2. The nature of the virus, the biological conditions of the glossinae and the opportunities for contact between them and man are responsible for this. There is every likelihood that the endemic will spread beyond its present limits and that the virus, which is sometimes arsenic-fast, may spread through the neighbouring territories.

"3. In the present case, the natives possess no safeguard against infection, but will, on the contrary, be the first to spread it, by reason of their migratory habits and racial ties. The effects of chemical prophylaxis are thus bound to be checked by the continual importation of fresh strains of trypanosomes, until supervision over the movements of persons and over traffic in general becomes the rule and the foci where the glossinae depend exclusively on man can be evacuated or cleared by means of deforestation."

2. *Epidemiology of Sleeping-Sickness in the Upper Uele (Belgian Congo).* By H. Lyndhurst DUKE and L. VAN HOOFF. [pp. 346–362. With 4 maps.]

The endemic zone of Upper Uele was chosen for this enquiry because this district, while easily accessible, constitutes a group of foci well

separated from those of Uganda and of the Semliki Valley, and could provide different clinical observations and different strains of trypanosomes.

Little is known of the history of the disease in this district, but there is some evidence that it has been there for a long time. It is probable that formerly the endemic wave spread from the north-west towards the south and east. Several maps of the district are given. On their journey the authors came into contact with the Belgian anti-trypanosomiasis medical organization: a general programme of their activities is given. It consists of (1) Complete census of the population and patients; (2) Rational and complete treatment of all patients; (3) Evacuation of dangerous zones; and (4) Deforestation and sanitation of infested villages and river-crossings.

Only six weeks were available to cover an enormous area; an account of the itinerary is given, and it is stated that in addition to epidemiological researches proper, the author's aim was to collect human trypanosomes and cattle and game trypanosomes, to make observations on *Glossina* and possibly to collect their flagellates with a view to subsequent laboratory work.

A general account of the country is given. *G. palpalis* is present practically all over the complicated system of the Uele rivers, and the authors gathered the impression that a large part of the population is constantly exposed to the fly and particularly so during the rainy season. The flies have also a large choice of other hosts, notably reptiles and game; and it is clear that crocodiles, and also monitors and perhaps the large snakes, constitute a very important item in the diet of the fly. The *Glossina* captured on the Uele, the Kibali, and the Dungu, where crocodiles abound all the year, contained *T. grayi* in the proportions of 13 and 22 per cent. respectively, whereas flies caught on the small rivers, where in the dry season there are no crocodiles, revealed no flagellates. Only one other species of *Glossina* was seen, viz., *G. fusca* or *brevipalpis*, a single specimen of which was captured in very dense forest. During the visit to the Kawa forest on the western bank of Lake Albert, *G. pallidipes* was found to be abundant in the close vicinity of *G. palpalis*; twenty-five were dissected, but no flagellates were found.

The authors state they cannot speak authoritatively about the number of game present in the district, but they believe that, owing to unrestricted hunting on the part of the natives, the game was rapidly growing scarcer. Elephant, white rhinoceros, hippopotamus, buffalo, giraffe, river-hog, wart-hog, water-buck, bush-buck, hartebeeste, bongo (*Boccorcus*), cob, a large unknown species of forest cephalophoid and the "oribi" were observed. Of these, elephant, buffalo, bush-buck, water-buck, hartebeeste, cob, and wild pig are widely distributed throughout the whole area, and certainly play a part, though probably a small one, in the diet of *G. palpalis*. Apart from man the principal hosts appear to be crocodiles, wild pig, and hippopotamus.

Information based largely on documents provided by the Belgian Mission is given regarding the six foci into which the area is divided.

Aba-Faradje Focus.—It is uncertain whether this is really a focus, as most of the cases diagnosed were proved to be imported. The authors visited part of the focus, but were unable to find evidence of sleeping sickness.

Dungu Focus.—In this district cases of the disease are only exceptional. In 1926, 26,901 persons were examined, but only 9 new

cases of the disease were discovered. Although all the rivers are infested with *Glossina* and the natives are frequently exposed to their bites, and notwithstanding frequent introduction of the virus from neighbouring districts, the infection shows no tendency to spread. A small quantity of live-stock has been introduced at Dungu and a single examination of a small herd showed about 23 per cent. of the animals to be infected with *T. vivax* and *T. congolense*. Despite this the mortality during the last few years has not been great.

Niangara Focus.—A few sporadic cases are found, particularly to the south of the Uele. It is interesting to note that south of this focus the river Bomokandi, although thickly infested with *Glossina*, continues to be free from infection.

Amadi Focus.—This focus is comparatively recent and knowledge of it dates to 1925, when 10 new cases were suddenly discovered. Probably all these were imported, and since 1926 no new cases have been discovered.

Bangaro Focus.—This is the most heavily infected region of the Upper Uele. In 1924, 3.59 per cent. of the population was found to be infected, and in 1925, 1,557 patients were undergoing regular treatment for the disease. During 1926, 223 new cases were discovered as against 270 during the previous year.

Doruma Focus.—This focus, although not as important as that of Bangaro, nevertheless constitutes a danger for the Amadi districts and the Dungu territory with which trade relations are increasing.

Regarding the Upper Uele district as a whole, it is apparent that the efforts of the Medical Service during the last three years have been crowned with success and that the disease is abating. In the authors' opinion the causes are as follows: (a) As complete as possible a census of the natives; (b) chemical prophylaxis; (c) creation of the road system; and (d) prohibition of certain areas.

An experiment was undertaken with a view to ascertaining the preventive action of "Bayer 205." The experiment was undertaken with the employees of the Kilo-Moto mines, which, in 1926, established prospecting camps in the thick of the infected zone on the Kibali. As in 1926, four cases of sleeping sickness occurred in natives of non-infective districts who had recently come to work in the infected zone, it is concluded that the *Glossina* of the Kibali can infect man. The employees were divided into two groups, one of which received 2 cgm. of "Bayer 205" per kilo. of body-weight, and the other of which received no treatment and were used as controls. So far, however, the experiments have been entirely negative, as no case of the disease has been discovered, either amongst the treated or amongst the controls. The authors state that they fear the duration of the preventive action of Germanin has been grossly exaggerated, but from experiments now in progress, and which will have to be continued for several years, it is hoped to obtain conclusive results.

Short though their tour was, the authors were able to collect sufficient observations and information to form an opinion of the biological problem in the area. They consider that in the Upper Uele there is a virus of average strength and that this virus is distributed in a very sporadic manner. *G. palpalis* were everywhere, but only in very small numbers. The natives themselves are also everywhere and never in compact settlements. In view of (1) the small percentage of flies whose salivary glands become infected, (2) the percentage of

natives carrying the virus (local maximum about 7 per cent., general maximum 0·3 per cent., (3) the percentage of meals made by *Glossina* on man in comparison with other hosts, and (4) the probable percentage of strains cyclically not transmissible, the authors believe that there is no likelihood of sleeping sickness spreading to any considerable extent at least in the near future and in existing circumstances.

3. *Epidemiology of Sleeping Sickness in Budama and Kavirondo. Additional Notes and Various Observations regarding Treatment.*
By L. VAN HOOF. [pp. 363-378.]

The following are the general considerations, summary and conclusions :—

“ For the epidemiological survey of a country, especially from the point of view of sleeping-sickness, no factor—economic, pathological, ethnological, or other—is devoid of importance ; moreover, factors which appear to have no influence upon the biological conditions of an endemic or epidemic may require to be considered when prophylactic measures are being undertaken. This appears to me a sufficient excuse for any tediousness in these reports, which, I may add, are still very incomplete and will continue to remain inaccurate in many ways until they have been tested by many years' experience. Further, the experiments which appear conclusive in this survey are conclusive only for that particular place and that particular time ; investigations of this kind, carried out on a uniform plan, must be repeated wherever the disease exists, and repeated again and again.

“ The enquiry in the Budama district and Kavirondo was begun at the end of February 1926, and the last visit of inspection was carried out in May 1927. Climatic conditions during these fifteen months were substantially unaltered, and what is lacking in these observations, therefore, is a study of the general aspect of the area during one of the usual droughts and famines. It is, moreover, obvious that in certain parts of this country the population is now rapidly increasing, principally in Busitema, where numerous natives who had left, either of their own accord or by order of the authorities, are returning to their former fields. More especially in the neighbourhood of the Bulugwe hills, which were formerly decimated by sleeping sickness and where, at the beginning of our enquiry, there was neither population nor fly, natives and even Europeans are now growing crops and establishing enterprises.

“ This state of affairs may increase the density of the population in other areas from which the fly has not disappeared, as, for instance, on the shores of the lake or the banks of the Mpologoma and Namatala. Very close contact may thus be re-established between man and fly, such as probably existed for many years before the great Uganda epidemic.

“ Will another epidemic necessarily follow from this new situation ? There is nothing to prove that it will be so. In various districts in the Belgian Congo—for instance, on the banks of the river Bomokandi—trypanosomiasis has not yet obtained a footing, although trypanosome-carriers have several times been introduced. It is essential that the virus introduced should be highly contagious, and, as has been proved by the recent experiments of Dr. H. Lyndhurst Duke in the case of isolated strains in various parts of Central Africa, that it should be readily transmissible by glossinae infected in the salivary glands.

“ Presented in this way, the problem of the spread of trypanosomiasis appears in a new light, and we must deduce therefrom the practical measures to be adopted in the campaign against sleeping sickness. The first measure will be to watch any fresh virus introduced into an area which, owing to its biological conditions, is likely to develop a further outbreak of an epidemic, whether it is at present immune or in a stationary endemic state.

"A fact upon which I have already insisted in these supplementary notes is the limited area of the 'danger zones,' where it appears certain that natives become infected one by one and from time to time renew the stock of transmissible trypanosomes in the tsetse. As is the case at the edge of the Busembe cliff, it seems to me that these complex reservoirs of trypanosomes are extremely small in area and consequently easy to destroy. Prophylactic measures should therefore take account of this fact and an endeavour be made to discover the reservoirs.

"Generally speaking, the conclusions of the first enquiry in Budama and Kavirondo still hold good. A few further deductions can be made with regard to the practical prophylaxis and the therapeutics of sleeping sickness.

'1. As regards prophylaxis:

"Necessity for supervising the movements, and consequently for a census and identification, of the natives.

"Discovery and destruction of danger-points where the biological conditions necessary for the maintenance of the endemic exist. These places, which are comparatively few in number and very limited in area, can be improved without any great labour or mass removal of the natives.

"Efficacy of chemical prophylaxis when combined with the above measures.

"2. As regards therapeutics:

"Remarkable efficacy of tryparsamide, which should be used systematically in all cases where possible. Sulphoxyl-salvarsan and bismuth-tryparsamide are of no practical value. 'Bayer 205' should be reserved for arsenic-fast cases and provisionally as a preventive to be given to natives who are obliged to work under conditions which make them liable to infection."

4. *General Remarks on Sleeping Sickness in the T. gambiense and G. papalis Regions based upon Researches carried out in Budama, Kavirondo, the Upper Uele and the Semliki Valley.* By L. VAN HOOFF. [pp. 379-381.]

This short article by VAN HOOFF consists of general remarks on sleeping sickness in the *T. gambiense* and *G. palpalis* regions based upon researches carried out in Budama, Kavirondo, the Upper Uele and the Semliki Valley.

5. *The Treatment of Sleeping-Sickness by Ingestion of Tryparsamide.* By L. VAN HOOFF. [pp. 382-384.]

In this paper VAN HOOFF reports upon four patients who were treated by oral administration of tryparsamide. In three of the patients whose lumbar fluid was more or less definitely impaired, the treatment—even with doses of 25 cgm. per kilo—was entirely ineffective. In one recent case with unimpaired spinal fluid, doses of from 5 to 11 cgm. produced apparent cure.

6. *Subsidiary Research. Preventive and Curative Action of "Spirocid" in African Relapsing Fever.* By L. VAN HOOFF. pp. 385-388.]

This article, also by VAN HOOFF, records observations on the preventive and curative action of "Spirocid" in African relapsing fever. It is concluded that the drug has an undoubted preventive and curative action. Its preventive action is in practice the more important; the curative action seems obviously weaker and slower than that of the arzenobenzols.

VII. General Recommendations for the Control of Sleeping Sickness in African Dependencies. By F. K. KLEINE, L. VAN HOOF, and H. L. DUKE. [pp. 391-392.]

These are :—

" 1. The movement of natives ought to be controlled.

" This implies :

" (a) A census, carried out by the Administration, of all natives.

" (b) The institution and employment of an identity book or card for each native, in which can be included a medical passport, to which reference will be made later on.

" (c) Delimitation of areas, entry into and departure from which are contingent on the possession by the native of a visa from the medical authorities stating that he is free from trypanosomiasis.

" (d) The formulation and promulgation of a law or laws giving force to all these regulations.

" It is desirable, and in French and Belgian territory has been proved practicable and efficacious, that the medical authorities should, in certain circumstances, be endowed with judiciary powers, as far as concerns the enforcing of this legislation.

" (e) An international agreement, between the Administrations of all countries in which human trypanosomiasis occurs, about the control of the disease on frontiers ; an agreement similar to those adopted to control epidemic infectious diseases such as plague and smallpox.

" (f) The establishment of observation-posts where the examination and control of visas can be carried out.

" 2. The census of infected natives ought to be thorough and complete.

" To ensure this aim there must be :

" (a) An adequate control over the movements of natives, as already indicated above.

" (b) An adequate medical personnel employing the accepted methods of diagnosis.

" (c) A medical passport for every native, on which can be periodically recorded the results of examination for human trypanosomiasis.

" (d) Legal means of compelling natives to submit to medical examination and treatment.

" 3. Natives infected with trypanosomiasis ought to be treated.

" Without insisting on the method of treatment, which will vary according to local circumstances, infected natives ought to be compelled to submit to treatment.

" This implies :

" (a) If necessary, confinement in a hospital.

" (b) Withdrawal of travel permit and medical passport, *pro tem*.

" (c) After-treatment, careful record of visits, treatment received, etc.

" This is especially important in the case of natives who come up at intervals for treatment, but who are not confined to hospital.

" 4. The evacuation of heavily infected zones.

" This is an urgency measure, and only to be applied in special cases ; such are epidemic extension in an endemic focus ; impossibility of breaking contact between fly and man ; insufficiency of medical and administrative personnel to carry out prophylactic measures, or of natives to set on foot and maintain sanitary measures.

" Before resorting to this measure, organised concentration of population should be tried in carefully chosen areas, where contact between fly and man can be eliminated or adequately controlled and reduced.

" 5. Clearing measures are generally very costly, and, unless carried out under the control of trained entomologists, are of little permanent benefit. In *palpalis* regions, such measures should be restricted to much-frequented places, and they must be thorough and well-maintained. Otherwise they are useless."

W. Yorke.

ENZER (A. J.). **A Sleeping Sickness Survey.**—*Kenya & East African Med. Jl.* 1928. Mar. Vol. 4. No. 12. pp. 386-390.

Commencing in August, 1926, a survey was made of the lakeshore Kavirondo population of Victoria Nyanza with a view to ascertaining the present position as regards sleeping sickness. The task was formidable and over 209,000 people were seen: some account is given of the difficulties encountered. The preliminary examination made was gland palpation—usually the cervical, but in some localities the axillary. In suspicious cases gland puncture was performed and the fresh gland juice examined microscopically; this was followed in negative cases by examination of centrifuged citrated blood, and by spinal puncture. In over 80 per cent. of cases with gland enlargement trypanosomes were found in the fresh gland juice at the first examination and in less than 10 minutes' search. Examination of centrifuged blood was unsatisfactory, being negative in many cases in which trypanosomes had been found in the gland juice. Cerebrospinal cell counts of 200 or more were regarded as diagnostic of trypanosomiasis, other diseases producing a high cell count having been first eliminated.

The census was completed in November, 1927, and established several important facts. It proved that an examination on a wholesale scale can be accomplished and exact figures for any disease ascertained. It has shown the exact sites of infection, the easy method of controlling it in the future, and finally Kenya's comparative freedom from the disease. The educational value to the natives was great. In all, 388 cases of sleeping sickness were discovered and of these 109 were found in an area of approximately four square miles with a population of 845. This was the only place where such a high percentage of infection occurs, the other cases being found scattered along the lakeshore.

W. Y.

MURAZ (G.). *Résumé de l'action, en Afrique Equatoriale Française, pendant huit ans (1920-1927), d'un secteur de prophylaxie de la maladie du sommeil. [Eight Years' Experience in French Equatorial Africa of a Sector of Prophylaxis of Sleeping Sickness.]—Bull. Soc. Path. Exot.* 1928. Jan. 11 & Feb. 8. Vol. 21. Nos. 1 & 2. pp. 54-65; 141-158. With 3 figs. & 4 charts in text.

I. These papers commence with an attempt to determine the value of the sleeping sickness campaign in Sector III (South of Tchad) since its inception in 1919. A map of the Sector is given showing year by year, and zone by zone, the annual percentage of new contaminations; and also the situation of the two segregation camps, the three "Postes-Filtres" and the 15 villages of free segregation. In centres the patients have been treated methodically and those in the bush have in general received a sufficient number of injections to give them a chance of recovery and to protect the rest of the inhabitants; but on consulting the tallies and records it is found that many of these were insufficiently treated since they were absent at the time of treatment or fled at the approach of the doctor: such are dead.

The number of individuals examined, of those atoxylized and of new cases during the year 1919-1926, is set forth in a table. The fall in the number seen, which is shown in the last two or three years, is due to the establishment of the segregation villages. These have been visited at least once a year and the new cases which have been diagnosed

have received in the villages of "ségrégation libre" a series of six injections of some arsenical. Information is supplied in a table of the number of persons examined, the number of injections given and the number of new cases seen, at each of the three observation posts, viz., Fort-Archambault, Manda, and Lai-Béhagle.

The end of 1926 has seen practically the conclusion of the new prophylactic programme, which consisted essentially of free segregation during 4 years (three for treatment and one for observation) of the patients diagnosed in the course of one very complete tour annually. The author believes that the segregation camp at Fort-Archambault and the station for treatment at Lai-Béhagle should be maintained for some time longer in order to educate the patients of the villages and make them appreciate the "ségrégation libre." This system is next defined and its advantages discussed in some detail. In 1925 attention was drawn to the remarkable results obtained in the Egyptian Sudan by the organization of village lazarets, and the question arose whether this excellent system should at once be substituted for that of frequent tours and segregation camps. The author thinks not. The segregation camp receives two classes of cases, first those who desire methodical treatment and secondly those who have avoided the medical touring mission. Stress is laid on the latter group. The only prophylaxis hitherto undertaken has consisted in frequent tours, but their frequency in a vast sector is from the point of view of medication quite minimal and the sterilization which results has been estimated at the Pasteur Institute of Brazzaville to be only 17 to 24.5 per cent. The segregation camp plays a necessary rôle in dealing with the fugitives. All who have avoided the medical touring mission are notified and taken by the Administration to Fort-Archambault or to Béhagle, where they receive treatment. The patients in Sector III know that when they are absent at the time of the visit of the medical mission they will be taken to the Centre. Whilst introducing the system of village lazarets the author desires to continue the segregation camps, so that the native learns that he must either undergo treatment at the village of segregation "ségrégation libre" or at the camp of segregation "ségrégation imposée."

The situation of the fifteen villages of "ségrégation libre" in Sector III is given. These villages are distributed in the various portions of the sector and each contains about 250 infected, all of whom are identified by means of a metal tally, a description of which is given. The paper contains a plan of a village lazaret and details of the working of the system.

The next section deals with new facts in the sector in the course of the years 1925-1926. The question whether all the villages on water-courses should at once be moved is discussed in some detail. Two obvious advantages would be decrease in both sleeping sickness and malaria, but the difficulties in the way are very great and in certain cases the procedure is definitely contra-indicated.

Reference is next made to the discovery of a new focus of trypanosomiasis at Tabila in the sub-division of Moundou, Moyen-Logone. The district is difficult to visit and was prospected for the first time in the middle of 1925. The people proved to be veritable savages, and it was almost impossible to deal with them. At Tabila about 11 per cent. of the population was infected; other heavily infected villages were Lolo, Bâ, Laokassi, N'Gouri, and Maïkann.

The author revisited Schoa in the third quarter of 1925 and was surprised to find that the village, which had been removed in 1921, had returned to its original site near the Tandjilé. He re-examined the population and found that whereas in 1920-22 there were 569 infected of 900 examined, in 1925 only 78 were infected out of 501, and none of these were new infections.

An enquiry was made into the birth rate in one of the infected villages (Morongoulaye) with a population of 1,105. The number of living children per woman varied from 0.2 to 2. Information is given in two tables of the coefficient of sterilization resulting from the annual treatment of a series of six injections of atoxyl. In two other tables the condition of the spinal fluid, as regards the number of cells contained, before and after treatment with tryparsamide, is given: these observations confirm the great value of the drug in the second stage of the disease.

After an account of attempts to treat cattle infected with *T. pecaudi*, with Fourneau 309, the author passes to certain general conclusions. In March, 1927, he left to his successor a new scheme of prophylaxis in the south Tchad region. The establishment of 15 trypanosome centres has not been effected without great effort on the part of the administration, of the healthy population, and of the patients themselves. These villages of "ségrégation libre" are an attempt to simplify the prophylactic effort especially with a view to better treatment. The freedom from taxation, the payment of labour, and the maintenance of domestic conditions constitute undeniable essentials for treatment: there result less avoidance of treatment, less deficient treatment and less mortality. A single thorough tour annually of each zone should suffice to ensure a progressive diminution of new infections. The new cases should be sent at once to their appropriate village of "ségrégation libre" and receive methodical treatment during a period of three years.

W. Y.

REVISTA MÉDICA DE ANGOLA. 1927. Jan. No. 5. pp. 1-91. With 12 figs. on 8 plates, 7 maps, 1 plan & 7 figs.—Os trabalhos das missões do sono estabelecidas nos distritos do Congo e Zaira, em 1923. [The Work of the Sleeping Sickness Mission in the Zaire and Congo Districts of Portuguese West Africa in 1923.]

The prevailing fly is *Glossina palpalis* in all the districts and the numbers of individuals infected are high: in Madimba the figure given is 13 per cent., and in Lunda the same, in Buela 11, Cuimba and Luva each 10 per cent., and many were in the second and third stages of the disease.

The measures undertaken for dealing with them were (1) removal of the population from the places heavily infested with tsetse, (2) segregation of chronic cases, (3) treatment with atoxyl of every case showing symptoms. The author is in favour of general administration, but this was not practicable. Camps were instituted where those under treatment could live segregated, but with considerable freedom, and posts were determined upon in central situations where treatment was carried out. Owing to the difficulty of obtaining "Bayer 205" and its price in 1923, atoxyl was largely used. 1 gm. in two doses in 24 hours was given to adults, 0.5 gm. to children over four years of age, and 0.4 gm. to those younger. This amount was

given weekly for ten doses, repeated after a month and so on till all symptoms disappeared, or there were indications of toxic effects of the arsenic. Except for a few mild cases of amblyopia and a dozen or so of amaurosis which recovered when the course was interrupted, the results are recorded as satisfactory. "Bayer 205" was employed in some instances, but though the author was struck with the rapid disappearance of the trypanosomes, he thinks that the nephritis and, in some patients, amblyopia progressing to complete amaurosis militated greatly against its general employment.

Brief notes of 28 cases are given all of whom took "Bayer 205," some after many doses (50 in one patient) of atoxyl. Of these five are stated to have been cured, five were keeping well, but the time was too short to say whether they could be regarded as cured, four were much improved, three were considerably better, eleven died; all of the last were advanced cases with much somnolence, some with fits or parietic symptoms. One improved slightly at first, but died later. In most of the twenty-eight the drug was given in 0.5 gm. doses hypodermically.

Figures are not given of the results in those treated by atoxyl.

H. Harold Scott.

KLEINE (F. K.). Ueber den Erreger der Schlafkrankheit. [**On the Parasite of Sleeping Sickness.**]—*Deut. Med. Woch.* 1928. Mar. 16. Vol. 54. No. 11. pp. 423-424. With 2 text figs. ["Robert Koch" Inst., Berlin.]

In this article Kleine summarizes once again the reasons which cause him to believe that *T. gambiense* and *T. rhodesiense* are the same, and that *T. rhodesiense* and *T. brucei* are distinct species. All the points raised have already received notice in this *Bulletin*.

W. Y.

DUKE (A. Lyndhurst). **On the Effect on the Longevity of *G. palpalis* of Trypanosome Infections.**—*Ann. Trop. Med. & Parasit.* 1928. June 12. Vol. 22. No. 1. pp. 25-32.

The author has often been impressed by the frequency with which cyclically infected *G. palpalis* survive to the end of an experiment, i.e., for a period of at least thirty days; and the impression gradually grew that the presence of developing flagellates in the fly's intestine helped to keep the insect in good condition, possibly by aiding in the disposal of the regular and copious meals taken during its working life at the laboratory.

Duke consequently decided to examine the accumulation of experimental data now available at the Entebbe laboratory. In a table details are given relating to transmission experiments with laboratory-bred flies during 1926 and 1927. It is noted that during the first few days of an experiment there is often a relatively heavy mortality, especially when the weather is hot and dry. Some of the newly-hatched flies neglect their first opportunity of feeding and either die of inanition, or lose their stamina and die early in the experiment. In the present argument all flies dying during the first ten days after the first feed on the infected animal are neglected. The conditions prevailing at the laboratory throughout the year are fairly constant, and no attempt was made to correlate the fluctuation in the death

rate with the changes of the weather. It is realized that the data presented are very limited, and that their statistical value cannot be very great. Under the most favourable experimental conditions 20 per cent. of infected flies is an unusually high figure. It is impossible to secure real uniformity in the environment of the experimental flies, and different strains of trypanosomes, or differences in diet, may exert different effects on the vitality of the fly. No notable organic cause of death among the experimental flies was detected. Heavy bacterial infections of the intestine sometimes were seen, but only very rarely in flies infected with trypanosomes. There is no evidence that these bacteria are pathogenic to the fly. Fungal infections, which are always lethal, were very rarely seen.

The author believes that, notwithstanding many possible fallacies, his figures do throw some light on the adaptation of a protozoon to an insect intermediate host; and that the association of trypanosomes of the *brucei* group with tsetse is, biologically speaking, a recent step in the evolution of these parasites.

All experiments that contained five or more infected flies, i.e., 10 per cent. to 12 per cent. of the total number, are summarized in a table. It is interesting to note that in certain of the experiments every infected fly lived for thirty days or longer, and it was these and other similar experiments which caused the impression that the flagellates might be actually beneficial to the fly—an impression which, however, was proved to be untenable from more comprehensive examination of the available data. The table, however, indicates unmistakably that the flagellates are not actually pathogenic to the fly, and that during the first thirty or forty days of the insect's life in captivity little or no disturbance is caused by their presence. In two other tables a comparison is made of the death rate of the uninfected and of the infected flies, but from these nothing very definite can be concluded save that the presence in its intestine of developing forms of the polymorphic trypanosome is not to any noticeable extent injurious to the fly; but, on the other hand, the evidence produced lends no direct support to the author's original impression that the presence of the flagellate infection in its intestine was beneficial to the fly.

W. Y.

LAVIER (G.). Rôle uniformisant de l'hôte vertébré dans la morphologie des trypanosomes du groupe *brucei*. [**Regulating Part played by the Vertebrate Host in the Morphology of Trypanosomes of the Brucei Group.**]—*C.R. Soc. Biol.* 1928. Feb. 24. Vol. 98. No. 7. pp. 520-524. [4 refs.]

Inoculation of a guineapig with the blood of a man or animal naturally infected with a trypanosome belonging to the group *brucei* causes an infection which terminates in death in from 4 to 6 months, whilst in the case of a trypanosome belonging to the group *gambiense* the infection lasts from 12 to 14 months or even more. The principal characteristic of this group of trypanosomes is their polymorphism. This is particularly marked in strains recently isolated and diminishes as time goes on. After an incubation period of 15 days to 5 weeks infection commences by the appearance of long and intermediate forms. A little later the short forms appear. It is during about the second week that the polymorphism is fully manifest. At this period division is so rapid that forms appear which lack a nucleus or a parabasal body.

The former disappear, but the latter are capable of dividing, producing a strain of blepharoplastless individuals. In addition to these forms there appear also others of small size with a free flagellum, and not longer than the typical short form. These small forms are equally affected by the rapidity of division, and one sees amongst them individuals with 2, 3, or 4 nuclei aligned like a chain of sausages in the cytoplasm. This appearance is of only short duration and lasts at the most about 14 days. When the defence of the animal is sufficient to cause fluctuations in the number of trypanosomes the appearance changes rapidly. Forms without a nucleus are no longer encountered, the blepharoplastless forms remain stationary. The division is less rapid and is regular and complete, and the variation in size is less pronounced. Towards the 3rd or 4th months of the infection the polymorphism is greatly reduced in comparison with what it was at the commencement of infection. Reference is made to the fact that strains long retained in European laboratories have lost their polymorphic characteristic and become indistinguishable from *T. evansi* and *T. equiperdum*. In trypanosomes of the *brucei* group, which live successively in an invertebrate and vertebrate host, the latter plays a part in regulating the morphology of the parasite, in that its defensive reaction diminishes the divergent element. Factors tending towards variation are, on the contrary, at work during the phase spent in the invertebrate which offers only a slight protection against the variations of the outside world.

W. Y.

SHIRCORE (J. O.). **Infection with Trypanosomes of the Cerebrospinal Fluid by Lumbar Puncture.** [Correspondence.]—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1928. Feb. 25. Vol. 21. No. 5. p. 434.

The author enquires whether an uninfected cerebrospinal fluid might not be infected by lumbar puncture of a case of sleeping sickness with trypanosomes in the blood. He believes that whenever possible the blood should be sterilized by a drug before lumbar puncture is made. He concludes as follows. "I have not undertaken a very large number of lumbar punctures, but if the experience of a few hundred is any criterion, it appears to me that quite a percentage of sterile cerebrospinal fluids might become infected by these means."

W. Y.

PERUZZI (M.). **Infection with Trypanosomes of the Cerebrospinal Fluid by Lumbar Puncture.** [Correspondence.]—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1928. June 30. Vol. 22. No. 1. pp. 95-96.

Reference is made to the question raised by SHIRCORE (above) concerning the possibility of infecting the spinal fluid by lumbar puncture. The author's researches have shown that there is a relationship between vascular injuries, changes in the cerebrospinal fluid, and the presence of parasites. The choroid plexus is the seat of early and massive extravascular invasion of trypanosomes passing into the cerebrospinal fluid through the epithelium; but the parasites are rapidly destroyed in the fluid, provided the albumin content is not sufficiently increased. In 43 positive monkeys, completely

examined, severe changes in the nervous system were visible; but in these monkeys suboccipital puncture had been performed only a few months earlier. Lumbar puncture may then be dangerous, especially if repeated in patients with *T. rhodesiense* infection, not only from the likelihood that blood may carry trypanosomes into uninfected cerebrospinal fluid, but principally because the blood which escapes into the fluid may increase its albumin content sufficiently to allow of parasites surviving in it.

W. Y.

COBB (W. G.). **Six Early Cases of Trypanosomiasis in Europeans in Northern Nigeria.**—*West African Med. Jl.* Lagos. 1928. Jan. Vol. 1. No. 3. pp. 56-57.

The author has recorded in tabular form signs and symptoms and treatment of six early cases of trypanosomiasis amongst Europeans in Nigeria. He emphasizes the fact that in each case the initial fever was severe and its nature suggested that it was not due to an ordinary attack of malaria. All the cases were treated with "Bayer 205" and all were apparently cured.

W. Y.

CORSON (J. F.). **A Case of Rhodesian Sleeping Sickness in a European, contracted in the Ikoma Sleeping Sickness Area of Tanganyika Territory.**—*Ann. Trop. Med. & Parasit.* 1928. June 12. Vol. 22. No. 1. pp. 17-19.

In this note a medical officer gives an account of his own case. He first encountered tsetse flies (*G. swynnertoni*) on April 24th, 1926. On May 4th and 5th he visited a small native settlement notorious for sleeping sickness and was again attacked by *G. swynnertoni*. Afterwards, until febrile symptoms appeared, he saw no tsetse. Symptoms appeared suddenly on May 22nd, and fever continued, notwithstanding quinine, until May 30th, when a blood film was found to contain from three to five or more trypanosomes per 1-12th inch field. "Bayer 205," 1.0, 0.8, 1.5, 2.0 and 2.0 gm., was given on the 11th, 13th, 18th, 23rd and 28th days of the disease. Symptoms were relieved by the first dose, but fever again developed about a fortnight after the end of the course. There was no albuminuria and inoculation of white rat and a guinea pig failed to produce infection. Four short courses of tryparsamide were then administered in July, August, September, and October. No relapses occurred within the observation period of eighteen months. The author remarks that probably the chief point of interest in the case is the fact that the patient was able to remain in the district, and after a brief period of convalescence to continue his work on sleeping sickness.

W. Y.

SAUNDERS (G.). **The Minor Symptomatology of Trypanosomiasis.**—*West African Med. Jl.* Lagos. 1928. Apr. Vol. 1. No. 4. pp. 74-75. [3 refs.]

Among the 46 cases of trypanosomiasis seen by the author during the past three years, certain minor manifestations occurred with some frequency. These were gingivitis and abnormalities of nutrition,

particularly early corpulence, which is possibly due to initial lethargy. It was observed that frothy vomiting, tenderness of the soles, localized transient oedema, and urticaria may occur after intravenous injections of "Bayer 205."

W. Y.

CHAGAS (Carlos). A forma cardiaca da trypanosomiase americana. [**The Cardiac Form of Chagas's Disease.**]—*Arch. Brasileiros de Med.* 1928. Jan. Vol. 18. No. 1. pp. 46–56.

Professor Chagas describes clearly the symptoms produced by the lesions and offers an explanation of their origin. In the acute stage of infection there is an intense and diffuse myocarditis in which proceed side by side mechanical and toxic destruction of the muscle fibres, and abundant infiltration of the interstitial tissue, particularly by macrophage plasma cells and lymphocytes. There is no arteriosclerosis, no involvement of the valves; the cavities are dilated without any accompanying hypertrophy of the walls. The clinical picture is very distinct: an enlarged heart, sometimes to the degree of *cor bovinum*, with persistent arrhythmia, and oedema which is slight only if present at all, and a low arterial tension. The arrhythmia is due to alteration of conductivity, to partial heart-block in the early stages, complete in the later. At first there are spaced extra-systoles, indicative of the commencement of the inflammatory process in the myocardium, increasing in frequency with aggravation of the myocarditis. Thereafter, according to the sites of the lesions, anomalies of rhythm may be due to either the excitability of the auricular muscle attaining a high degree leading to a final rhythm of tachysystole and fibrillation, or, if the lesions are chiefly in the automatic centres, to progressive functional defect and a permanent bradycardia.

H. Harôld Scott.

- i. CHAGAS (Evandro). Sobre algumas perturbações curiosas do rythmo do coração na Trypanosomiase Americana. [**Curious Disturbances of Cardiac Rhythm in American Trypanosomiasis.**]—*Folha Med.* 1928. May 5. Vol. 9. No. 13. pp. 149–153. With 10 text figs. ["Oswaldo Cruz" Hosp. & Inst., Rio de Janeiro.]
- ii. —. Sobre algumas perturbações curiosas do rythmo do coração na Trypanosomiase Americana (3a observação).—*Ibid.* June 5. No. 16. pp. 187–189. With 7 figs.
- iii. —. Sobre algumas perturbações curiosas do rythmo do coração na Trypanosomiase Americana (4a observação).—*Ibid.* June 15. No. 17. pp. 201–202. With 6 text figs.

i. The noteworthy point in the two cases here detailed is not merely the arrhythmia itself, but the fact that more than one type of arrhythmia was observed in each case. Thus, the first exhibited prolonged periods of bradycardia with pulsus bigeminus, at other times irregularity like that of complete arrhythmia, sinus arrhythmia, auricular fibrillation, and, again, that of extrasystoles. The various disturbances are represented by sphygmographic and electrocardiographic tracings which are explained in detail in the text. There appeared to be complete dissociation between the auricular and ventricular rhythms, and, as it were, multiple fresh focal stimuli at work. The heart was increased in size.

In the second, a man of 30 years, there was also cardiac enlargement, the pulse was regular, 40 per minute, but the cardiograph showed a regular ventricular rhythm of 45, with a slow and irregular auricular rhythm.

After a few days, though the ventricular rate remained the same, the auricular beat became vastly accelerated, 240 per minute. Neither atropin nor adrenalin subcutaneously had any effect, but inhalation of amyl nitrite profoundly modified the tracings; these revealed numerous extra-systoles of the right ventricle, while the auricular beat, though still irregular, became slower.

A probable, at least possible, explanation given is that there were widespread lesions of the auricular musculature with the development of new centres of excitability, leading first to tachycardia and later to auricular fibrillation.

ii. The author places another case of this complication on record; as in the former the irregularities of rhythm are very great and change rapidly, even in the course of 24 hours. They are ascribed to the temporary establishment of new centres of excitability. Several pulse-tracings are reproduced from this case, but they are too reduced to convey much useful information.

iii. The patient was a man of 41 years presenting marked cardiac irregularity with dilatation but no adventitious sounds. The symptoms were similar to those previously noted, but this patient on sitting up to take food died suddenly and a post-mortem examination was held. The heart was greatly dilated but without hypertrophy of the walls. Aggregations of "trypanosome cysts" were seen under the microscope and an intense cellular infiltration of the auricular walls and of the Keith-Flack node. The ventricular walls also showed infiltration, together with interstitial and parenchymatous myocarditis. [Though these findings may account for the irregularity of rhythm, they do not explain the sudden changes of beat and rhythm, occurring from day to day, as have been recorded in the clinical descriptions of these cases.]

H. Harold Scott.

VAN DEN BRANDEN (F.). L'emploi de la tryparsamide dans le traitement de la trypanosomiase humaine. Préface. [**Employment of Tryparsamide in the Treatment of Human Trypanosomiasis. Preface.**—*Ann. Soc. Belge de Méd. Trop.* 1927. Dec. Vol. 7. No. 3. pp. 211-214.]

This is a preface introducing the following eight papers on the use of tryparsamide in human trypanosomiasis. Tryparsamide is the sodium salt of N-phenylglycinamide-p-arsenic acid. It is a white crystalline powder, odourless, readily soluble in water and stable under ordinary conditions. The dose for an adult is 2 to 3 gm., and for a child .5 to 1 gm. according to its age. The author favours weekly doses of 2 gm. in the adult, because such doses give the same good results as large and more frequent doses, and because they reduce the ocular disturbance to a minimum. In patients of the first stage a total dosage of 20 to 40 gm. suffices, as a rule, to produce a cure. In chronic patients it is necessary to give 50 to 100 gm. Solutions should be prepared fresh, 2 to 3 gm. being dissolved in 10 cc. of cold sterile water. Such solutions should be clear, but they had better be filtered through sterile filter paper to remove any foreign body; any turbidity should cause the rejection of the solution. Boiling should be avoided, as it may give rise to decomposition and produce substances more toxic and less efficacious than tryparsamide. The drug is given intramuscularly or, more usually, intravenously.

Reference is made to "Tryponarsyl Meurice," a product of Belgian manufacture which has the same chemical formula as tryparsamide. The action of this drug in chronic human trypanosomiasis is on all points comparable with that of tryparsamide.

i. MARUGO. Note au sujet du traitement de la trypanosomiase humaine par la tryparsamide (A 63).—*Ibid.* pp. 215–247.

The author set out to answer the following questions :—

1. What is the action of tryparsamide in cases curable with drugs usually employed ; are there any differences and which is to be preferred ?
2. What is the action of tryparsamide in cases not curable with other drugs ; are the differences appreciable and can such cases be actually cured ?
3. What are the toxic actions of the drug ?
4. Should it be used in conjunction with other drugs ?

The patients selected for treatment fall into five groups. A. Patients in the last stage of the disease with profoundly altered spinal fluid and who had not been treated previously. B. Similar cases who had been unsuccessfully treated with other drugs. C. Cases in which the spinal fluid is but slightly altered and who may or may not have been treated previously. D. Recent cases with parasites in the blood or gland juice. E. Cases with very greatly altered spinal fluid who may or may not have received previous treatment and who exhibited very varied nervous manifestations.

The author's first endeavour was to ascertain the best dosage, and the most suitable intervals between the injections. He commenced with weekly injections of 1 gm. and as these were well tolerated decided to increase each dose by 0.5 gm. By this means he was able to reach doses as high as 7 gm. in an adult male, 6 gm. in an adult female, 4 gm. in a child and 3 gm. in an infant, in good general condition, without having to deplore any accidents. But as such massive doses did not give better results than smaller ones they were not used habitually and the author finally decided that the best quantity to be given at an injection was as follows: For adult males and females in good general condition 3 gm., and if the general condition was not very good 2 to 3 gm. ; and for children according to the age and condition 0.5 to 2 gm. The total quantity given in a single series of injections was as much as 60 to 80 gm., but, as a rule, it was not necessary to exceed 50 gm. for adults and proportionately less for children.

By this method the author has never had any serious toxic effects. The visual disturbances resulting from the use of tryparsamide only were sometimes rather grave, but they disappeared completely on cessation of treatment. In certain patients who came under treatment very late and had been previously treated with other drugs, visual disturbances were very pronounced and even total blindness sometimes occurred.

Those patients who exhibited pronounced nervous symptoms almost always showed rapid and considerable improvement as the result of treatment, whilst in cases of moderate intensity the benefit obtained was even more marked and constant. Certain information is given regarding the amount of the drug administered and the condition of the spinal fluid in respect of 131 cases, and as a result of his observations of these cases, the author draws the following conclusions :—

1. The action of tryparsamide whether American or Belgian has proved to be rapid, durable, constant, and definitely superior to that of any known drug. Relapses or incomplete cures are always due to extraneous causes, such as insufficient dosage, irregularity of the injections, and difficulties due to the patient.

2. Some very grave cases have not received much benefit, possibly owing to intolerance of the drug, or to the fact that the disease was so advanced that the organic reaction and resistance was nil.

3. Toxic reactions, either acute or chronic, are negligible. Cases of total blindness which occurred after treatment with tryparsamide have always been the subject of previous arsenical treatment.

4. Tryparsamide is, in the author's experience, definitely superior to all other medicaments known and employed in sleeping sickness.

- ii. VAN DEN BRANDEN (F.). *Essais de traitement de la trypanosomiasis humaine chronique par la "tryparsamide."*—*Ibid.* pp. 249–271. [3 refs.]

The author advocates the administration of tryparsamide in weekly doses of 2 gm. for adults, because the results obtained with such doses are similar to those obtained with larger doses, and the ocular troubles are reduced to a minimum. The total amount which should be administered varies from 50 to 100 gm. or more. The author remarks that prolonged treatment of a number of chronic cases lasting for 1½ to 2 years with soamin and emetic has resulted in permanent cure in some cases, but the period of treatment is more prolonged than that of tryparsamide and the results obtained are more uncertain.

A summary is given of the result of treating sixty-one chronic cases with tryparsamide. The results obtained were as follows:—

- A. *Patients with trypanosomes in the spinal fluid*
In 5 of 17 the spinal fluid has become normal.
- B. *Lymphocytosis in spinal fluid not exceeding 50 per cmm.*
In 5 of 7 the spinal fluid became normal.
- C. *Lymphocytosis in spinal fluid between 50 and 100 per cmm.*
In 4 of 9 the spinal fluid became normal.
- D. *Lymphocytosis in spinal fluid between 100 and 200 per cmm.*
In 3 of 12 the spinal fluid has become normal.
- E. *Lymphocytosis in spinal fluid between 200 and 500 per cmm.*
In 4 of 16 the spinal fluid became normal.
- F. *Lymphocytosis in spinal fluid exceeding 500 per cmm.*
In 4 of 8 the spinal fluid became normal.

In 25 of 61 cases of chronic trypanosomiasis treated by tryparsamide the spinal fluid became normal. This compares most favourably with the results obtained by prolonged courses of soamin and emetic. In only 17 per cent. of such cases the spinal fluid became normal. Details of the 61 cases are given in a series of tables.

- iii. KELLERSBERGER (E. R.). *Report on One Hundred Cases of Sleeping Sickness treated with Tryparsamide.*—*Ibid.* pp. 273–291. [12 refs.]

During the last two years the hospital of the American Presbyterian Congo Mission at Katanga has received one thousand cases of sleeping sickness. Patients came to the hospital from distances of over 150 miles and a regular camp for sleeping sickness cases near the hospital has made it possible to treat and control and follow most of the cases closely. All the patients came voluntarily and the results have been extremely satisfactory. The drugs used were atoxyl, soamin, "Bayer 205," and tryparsamide. The present report deals with the results

obtained with tryparsamide. The cases chosen have been divided into four classes :—

1. Early cases.
2. Cases with slight or moderate changes in the spinal fluid.
3. Cases with marked spinal fluid changes and great clinical changes.
4. Advanced cases previously unsuccessfully treated by other drugs.

On entry to hospital each patient was weighed, a thick drop blood preparation was taken, gland puncture made, and initial lumbar puncture done. The highest percentage (75 per cent.) of diagnoses was made by gland puncture ; 15 per cent. were made by examination of the thick drop of blood, and a certain number of advanced cases were only diagnosed by lumbar puncture. The doses vary in each case ; the more advanced the disease the smaller the dose given at first. In general an average of 5 cgm. per kilo. was found to be a good working dose. This was varied as each case demanded. The injections were given once weekly for 8 to 10 weeks, when a second lumbar puncture was done and the weight again noted. After a rest of two to three months, a second lumbar puncture was performed ; if this was normal a fourth lumbar puncture was made three months later, and if this was also normal the patient was discharged. The weight curve was a fine index for progress. Almost every one of the one hundred cases treated in this paper gained considerably in weight. In all of the cases the method seemed to result in cure, or, in much advanced cases, in complete arrest of the disease. In the far advanced cases a second course of treatment is advised after several months, even if the cell count is normal or almost so. Untoward results were very rare.

In a series of four tables information is given regarding the results obtained of the treatment of one hundred cases. The tables show the amount of drug given, the period over which the course of treatment continued, the weight immediately before and after treatment, and four months later ; and the condition of the spinal fluid before and immediately after treatment, and again three or four months, and eight and nine months after cessation of treatment.

The following are the conclusions :—

- " Tryparsamide is a very efficient trypanocide.
- " It is especially useful in advanced cases, and almost universally brings the spinal fluid back to normal in a comparatively short time.
- " It causes very marked clinical improvement.
- " Patients have remained well, gained much weight, and been apparently cured for more than a year after treatment.
- " It has very few bad after-effects, and is easily given.
- " It can be given either intravenously, intramuscularly, or subcutaneously with no reaction of any importance.
- " Blindness, though a danger, is not a frequent complication, and can be avoided.
- " It is a quicker and easier, less painful method than atoxyl, and therefore cheaper in the end.
- " It has successfully been given in the field by trained native workers.
- " It cures where other drugs have failed.
- " It is the most efficient drug so far available."

iv. LOPES. Résultats du traitement de la trypanose humaine par la tryparsamide.—*Ibid.* pp. 293-295.

Information is given concerning twenty-five chronic cases of trypanosomiasis previously treated with atoxyl, and then subjected to a

course of tryparsamide. In twelve of these the leucocyte formula of the spinal fluid had returned to normal. In eight the lymphocytosis diminished and in five it had increased. The patients received quantities of the drugs varying from 23 to 118 gm.

v. INFANTE. Essais de traitement de la maladie du sommeil par la tryparsamide.—*Ibid.* pp. 297-301.

The author presents a couple of tables showing the effect of tryparsamide in the treatment of 52 cases of sleeping sickness, all of which exhibit changes in the spinal fluid. The cases were divided into two groups; the first, consisting of 29 cases, had been previously treated with atoxyl or soamin, and the second, consisting of 23, had had no previous treatment.

The conclusions are:—

1. Tryparsamide is very efficacious in the treatment of sleeping sickness, even in very grave cases.
2. The single course of 50 gm. for an adult appears to cure 52 per cent. and to ameliorate greatly 48 per cent. of cases of sleeping sickness in the second stage.
3. The accidents resulting from such a course of treatment are insignificant; the ocular troubles are rare and not severe.

vi. DAVID. Le traitement de la trypanosomiase humaine par la tryparsamide.—*Ibid.* pp. 303-309.

Information is given regarding the treatment of twenty cases of sleeping sickness with tryparsamide. In most of the cases the doses given were insufficient.

vii. WILLE; WALLON (M.). Essais de traitement. [**Treatment Trials.**]—*Ibid.* pp. 311-318. [8 refs.]

These papers simply record in tabular form a number of cases of sleeping sickness treated by tryparsamide.

viii. TROLI (G.). Le traitement de la trypanose humaine par la tryparsamide. (Revue générale.) [**A Review.**]—*Ibid.* pp. 319-336. [22 refs.]

This paper is a general review of the work of the other authors on the treatment of sleeping sickness by tryparsamide. It is concluded in this survey that tryparsamide is a trypanocidal drug of the greatest value, both from the prophylactic and curative points of view. The drug is of great moral value to the natives, who witness veritable resurrections, and are beginning to have as much confidence in the treatment of sleeping sickness as they have in that of yaws and syphilis. Even very advanced cases may be cured and the accidents which from time to time occur are not serious when the drug is properly administered. The optimum dose is 0.03 gm. per kilo. given weekly to patients whose spinal fluid is changed. Other patients can tolerate as much as 0.05 gm. per kilo. Patients in the first stage of the disease should receive a total dosage of from 25 to 30 gm., the others between 50 or 80 gm., or more.

W. Y.

KEEVILL (Arthur J.). *Trypanosoma rhodesiense* Infection treated with "Bayer 205" or "Fournau 309."—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1928. June 30. Vol. 22. No. 1. pp. 83-84.
[Moravian Mission, Sikonge, Tabora, Tanganyika Territory.]

Amongst the cases of sleeping sickness diagnosed and treated during 1925, six are of interest in view of their reaction to "Bayer 205." All were infected with *T. rhodesiense*, and all had trypanosomes in the cerebro-spinal fluid. Details are given in the following table :—

Tabora Case No.	Sex/Age	Duration of Symptoms.	Treatment.			Cerebrospinal Fluid.			Present Condition.
			Date.	Drug.	Dose	Date.	Cells.	Trypan's.	
72	M. 40	3 days	28.10.25	B	1g.	26.10.26	90	Present	Excellent
			30.10.25	B	2g.	18.12.25	40	Nil	
			7.11.25	B	2g.	13. 1.28		Normal	
80	M. 20	8 days	14.11.25	B	1g.	14.11.25	30	Present	Excellent
			16.11.25	B	2g.	15.12.25	10	Nil	
			25.11.25	B	2g.	14. 1.28		Puncture failed	
85	M. 50	1 month?				28. 2.28		Puncture failed	Excellent
			30.11.25	B	1g.	29.11.25	10	30	
			2.12.25	B	2g.	16.12.25		Normal	
			9.12.25	B	2g.	6. 7.27		Normal	
86	M. 50	14 days				14. 1.28		Normal	Excellent
			7.12.25	F.	1g.	7.12.25	90	Present	
			9.12.25	F.	2g.	21.12.25	30	Nil	
			16.12.25	F	2g.	15. 7.26		Normal	
91	M. 50	11 days				3.11.27		Normal	Excellent
			11.12.25	B	1g.	11.12.25	R.B.C.	Present	
			14.12.25	B	2g.	21.12.25	20	Nil	
			19.12.25	B	2g.	6. 1.28		Normal	
97	F. 25	10 days	26.12.25	B	1g.	26.12.25	80	60	Excellent
			28.12.25	B	2g.	18.11.26		Normal	
						4. 3.28		Normal	

B="Bayer 205."

F="Fournau 309."

W. Y.

SAUNDERS (G. F. T.). *Intrathecal Bayer 205.*—*West African Med. J.* Lagos. 1928. Jan. Vol. 1. No. 3. pp. 44-46. [1 ref.]

Details are given of an attempt to treat five cases of trypanosomiasis by intrathecal and intravenous injections of "Bayer 205." The results appeared to be unsatisfactory and the following summary is given :—

- " 1. Five cases of Trypanosomiasis have been treated with small doses of very dilute "Bayer 205" intrathecally.
- " 2. Alarming symptoms may follow even these small doses.
- " 3. Advanced cases are not benefited.
- " 4. One acute case with definite cerebral symptoms but only 4 cells per cmm., C.S.F., appears to have been cured."

W. Y.

BRUYNOCHE (R.) & DUBOIS (A.). Action *in vitro* de divers alcaloides et produits chimiothérapiques sur des trypanosomes. [Action *in vitro* of Alkaloids and Chemotherapeutic Products upon Trypanosomes.]—*C.R. Soc. Biol.* 1928. May 4. Vol. 98. No. 14. pp. 1249-1250. [Bact. Inst., Louvain.]

After referring to the fact that certain drugs, such as atoxyl, are inactive *in vitro* and active *in vivo*, while emetic is equally active *in vitro* and *in vivo*, and other antiseptics are active *in vitro*, but inactive *in vivo*, the authors describe a number of experiments with various alkaloids devised with a view to ascertaining whether trypanosomes, which had been subjected to the action of these drugs *in vitro* for various periods, and are still motile, are capable of infecting animals. There was some slight discrepancy in their results, but the main fact appears to be that when the trypanosomes are still motile they are capable of infecting.

Further experiments were performed with trypaflavin and sodium emetic. These two drugs act in very dilute concentrations and the motility of the trypanosomes is soon affected. On two occasions the parasites were found to be still motile after being subjected to a solution of 1 in 100,000 of emetic for three hours and one and a-half hours, respectively, and on two occasions the same result was obtained with trypaflavin in the same dilution and for the same periods. No infection was obtained in mice injected with these trypanosomes. In other experiments, however, the results were contradictory.

The authors then turned their attention to drugs inactive *in vitro*, but very active *in vivo*, e.g., trypanarsyl Meurice and "Fournneau 309." Trypanosomes remained motile in 1 per cent. solution of these drugs for many hours and the washed parasites infected animals.

W. Y.

KLIGLER (I. J.). Susceptibility and Resistance to Trypanosome Infections. IV.—The Duration, Specificity and Hereditary Transmission of Resistance acquired after Cure with "Bayer 205" (Germanin).—*Ann. Trop. Med. & Parasit.* 1928. June 12. Vol. 22. No. 1. pp. 21-23. [2 refs.] [Dept. Hyg. Hebrew Univ., Jerusalem.]

The object of this paper is to report experiments bearing on the specificity of the resistance exhibited by animals cured with "Bayer 205" and on its intra-uterine transmissibility from mother to offspring. Guineapigs infected with *T. evansi* were, after the infection had lasted several weeks, cured with "Bayer 205." After varying intervals the cured animals were re-infected, some with the homologous strain, and others with *T. gambiense* and *T. rhodesiense*, respectively. In a few instances it was possible to test the resistance of offspring from "Bayer 205" treated mothers born at a time when the mothers were fully refractory to re-infection. The young guineapigs were always infected with the homologous strains. As a result of his work, the author concludes that animals infected with *T. evansi* and treated with "Bayer" are as refractory to re-infection with *T. gambiense* as with the homologous strain and for approximately the same period. The converse is also the case. Separation of species by this means is not feasible. The refractoriness or resistance to infection is not transmitted from mother to offspring.

W. Y.

MUTERMILCH (S.) & SALAMON (E.). L'immunité méningée au cours du nagana expérimental du lapin. [**Meningeal Immunity in Experimental Nagana of the Rabbit.**].—*C.R. Soc. Biol.* 1928. May 25. Vol. 98. No. 17. pp. 1512-1514. [3 refs.] [Pasteur Inst., Paris.]

Reference is made to the previous papers of the authors on this subject and also to that of LEVADITI and DELORME [*ante*, p. 352 and p. 350]. Their present work confirms in the main that of LEVADITI and DELORME. It was found that *T. brucei* injected intraperitoneally in rabbits could traverse the vasculo-meningeal barrier and reach the cerebrospinal fluid where their presence could be demonstrated by the inoculation of the fluid into mice. Of 57 inoculations made 14 gave a positive result. The trypanosomes found in the spinal fluid during relapses are identical with those in the blood; that is, they are resistant to anti-body. The cerebro-spinal fluid of animals inoculated intraperitoneally is poor in cells and does not contain antibody, although this may be plentiful in the serum. Trypanosomes inoculated subdurally into normal rabbits rapidly invade the circulation and remain in the spinal fluid for 4 to 5 days; then they disappear suddenly. The specific antibody appears in great quantity in the blood, but only in small amount in the cerebrospinal fluid. It was found to be impossible to enrich the antibody in the spinal fluid, and the author believes that what is present comes from the circulation, owing to the marked meningeal reaction provoked by the parasites.

W. Y.

LEVADITI (C.) & DELORME (M.). Mécanisme des accidents nerveux tardifs des trypanosomiasés. [**Mechanism of the Late Nervous Symptoms of Trypanosomiasis.**].—*C.R. Soc. Biol.* 1928. July 6. Vol. 99. No. 23. pp. 379-381. [4 refs.]

It has been shown in a previous communication (*ante*, p. 350) that subarachnoid injections into rabbits provoke the following reactions: (1) An infection of the subarachnoid cavity lasting 4 to 6 days; this local infection is followed by invasion of the circulation. (2) A general refractory condition in which the subarachnoid cavity also participates.

The authors have enquired whether subarachnoid injection of dead trypanosomes, subcutaneously or intraperitoneally, provokes the appearance of trypanocidal antibodies. An account of the technique used is given. Washed trypanosomes from a rat suspended in normal saline were killed by heating to 56° C. for an hour. Nine rabbits were given one or more intrarachnoid injections of 0.4 cc. of the sterilized trypanosome suspension (three animals received one injection, and six received three injections at a few days interval). After intervals varying from 5 to 33 days from the last inoculation, the animals were tested by intrarachnoid injections of living trypanosomes. In all cases the prepared animals reacted as the controls and it appears from this work that:—

(1) The repeated inoculation of dead trypanosomes into the subarachnoid cavity produces neither general immunity nor a condition of local resistance.

(2) The neuro-immunity only appears as the result of a trypanosome infection of the blood and of the subarachnoid cavity.

(3) The antigen of the dead trypanosomes does not play any part in the creation of a refractory state of the nervous system and its envelopes.

W. Y.

- i. KOKAWA (Hotsuka). Immunitätsforschung über die experimentelle Trypanosomiasis. (I. Mitteilung.) Experimentelle Studien über die Agglomeration. [**Immunity Investigations on Experimental Trypanosomiasis. Experimental Studies on Agglomeration.**]—*Fukuoka-Ikwadaigaku-Zasshi*. (*Fukuoka Acta Med.*) 1927. Aug. Vol. 20. No. 8. German summary pp. 58-59. [In Japanese.] [Bact. Inst., Med. Faculty, Imperial Kiushu Univ., Fukuoka, Japan.]
- ii. —. Die Immunitätsforschung bei experimenteller Trypanosomiasis. (II. Mitteilung.) Ueber die Trypanolyse und ihren Mechanismus. [**On Trypanolysis and its Mechanism.**]—*Ibid.* 1928. Jan. Vol. 21. No. 1. German summary pp. 1-3. [In Japanese.]
- iii. —. Die Immunitätsforschung bei experimenteller Trypanosomiasis. (III. Mitteilung.) Studien ueber Trypanosomenanaphylaxie. [**Studies on Trypanosome Anaphylaxis.**]—*Ibid.* 1928. Feb. Vol. 21. No. 2. German summary pp. 18-19. [In Japanese.]

i. In his experimental studies on agglomeratins, the author has used *T. lewisi*, *T. equiperdum*, *T. gambiense*, and also their serum-fast strains. It was found that the serum of experimental animals could be made capable of producing agglomeration either by infection or by injection of dead trypanosomes. The agglomerating substance can be absorbed by living trypanosomes, and from them the agglomeratinin can be obtained pure. The resistance of this substance to various physical and chemical conditions was determined; it is filtrable. It is stated that the agglomeratinin passes from the mother to the foetus, and that it is also found in the milk.

ii. The trypanocidal action of infected serum is two-fold; it partly acts through defective nutrition, and partly through trypanolysis. For the latter a combination of antigen and antibody and complement is necessary. The morphological changes which occur in trypanolysis are described. The trypanolytic antibody (trypanolysin) resists heat and cold and bacterial contamination, but is damaged by sunlight and a mercury quartz lamp. It is filtrable but not dialysable. The trypanolysin is absorbed by living trypanosomes at 0° C., but set free again by warming for half an hour at 50° C. Trypanolysis occurs only at body temperatures and not at 0° C., because the complement is not anchored at low temperatures. As in the case of haemolytic complement the trypanolytic complement consists of three fractions.

iii. In this paper the author describes certain experiments on anaphylaxis with the same three strains of trypanosomes. A guineapig can be made anaphylactic by a small injection of trypanosome protein and shows on injection of a large dose five weeks later typical, severe reaction. The serum of rabbits treated several times with trypanosome protein, or injected with living trypanosomes, can make guineapigs anaphylactic. The intravenous injection into guineapigs of a mixture of trypanosome protein and antisera prevents the development of a fatal shock. It is possible by means of the antigen-antibody mixture experiments to differentiate between *T. lewisi* and the pathogenic trypanosomes, but not between *T. gambiense* and *T. equiperdum*. If the mixture of antigen and antibody be centrifuged, it is found that the sediment produces typical shock, whilst the supernatant fluid

produces very slight symptoms. The surviving guineapigs are not susceptible on further injections. If a definite dose of trypanosomes is mixed with fresh normal guineapig serum and allowed to stand for two hours in the incubator "trypanosome anaphylatoxin" is produced *in vitro*. The trypanosome anaphylaxis in guineapigs is accompanied by marked decrease in the coagulability of the blood, decrease in the leucocytes, changes of temperature and decrease of complement. The specific gravity of the lungs is, owing to distension, very much lessened. The anaphylactogen of trypanosome proteid is hardly damaged by drying, shaking, or cold, but is destroyed by heat, sunlight, artificial sunlight, and acids and alkalies. It is to some extent filtrable. The anaphylactic antibody behaves in a very similar way.

W. Y.

ZAVAGLI (V.). Influence des bactéries et des spirochètes tués vis-à-vis du nagana expérimental. [**Influence of Bacteria and Killed Spirochaetes on Experimental Nagana.**—*C.R. Soc. Biol.* 1928. June 29. Vol. 99. No. 22. pp. 307-309. [11 refs.] [Pasteur Inst., Paris.]

The author refers to a number of papers dealing with the question whether an antagonism exists between trypanosome infections and infections due to spirochaetes and bacteria. He points out that the conclusions reached were usually indefinite and sometimes more or less contradictory. In his experiments, Zavagli examined the effect on the course of the *T. brucei* infection in mice of injections of 2,500 millions of various bacteria, streptococcus, pneumococcus, meningococcus, and *Ps. pyocyanea* killed by minimal temperatures; and also 0.5 cc. of a culture of *Leptospira icterohaemorrhagiae* killed by a temperature of 54° C. Experiments showed that the dead bacteria did not exercise any inhibitory action on the trypanosome infection. The spirochaetes, if alive, appeared to retard the evolution of the trypanosome infection, but when they were dead they had no action.

W. Y.

ZAVAGLI (V.). Recherches expérimentales sur l'antagonisme entre le *Bacillus anthracis* atténué et *Trypanosoma brucei*. [**Experiments on the Antagonism between *B. anthracis* and *T. brucei*.**—*C.R. Soc. Biol.* 1928. June 29. Vol. 99. No. 22. pp. 310-312. [5 refs.] [Pasteur Inst., Paris.]

The author refers to certain contradictory observations which have been published concerning the antagonistic action of *Bacillus anthracis* against trypanosomes, and in order to clear up the matter he has undertaken the experiments described in this paper. The strain of *B. anthracis* used killed mice in three days. The trypanosome employed was *T. brucei*. It was found that a marked antagonism existed between the two species. According to the dose of the one or the other given either the trypanosomes or the bacteria predominated, but in all cases the morbid process was modified. The two germs were never found in the blood at the same time. In almost all cases where the two organisms were injected in a mixture, the conflict between them ended to the advantage of *B. anthracis*, but its appearance in the blood was, as a rule, delayed. In two cases neither bacteria nor trypanosomes were found in the blood. In mice in which the bacteria were injected the

day after the inoculation of trypanosomes, the *B. anthracis* was eliminated and the development of the trypanosomes sometimes retarded. The mice, which died of trypanosomiasis, were examined for *B. anthracis* twenty-four hours after death by inoculation of the blood or spleen into healthy mice. Sometimes the result was negative and sometimes the infection resulting was very slightly virulent.

W. Y.

WENYON (C. M.). **The Loss of the Parabasal Body in Trypanosomes.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1928. June 30. Vol. 22. No. 1. pp. 85–87. [9 refs.] [Wellcome Bureau of Scientific Research, London.]

For many years it has been known that if rats infected with *T. brucei*, or other trypanosomes, are treated with oxazine or acridine there appears in the blood a certain number of trypanosomes which have no parabasal body ("ablepharoplastic"). By keeping the animals saturated with the drug, it is possible to obtain races which are completely and permanently "ablepharoplastic." In nature such a condition is known to occur only in the case of *T. equinum*. LAVIER has drawn attention to the fact that in certain strains of *T. gambiense*, *T. rhodesiense*, and *T. brucei*, varying proportions (0.5 to 10 per cent.) of the trypanosomes were "ablepharoplastic" [*ante*, p. 358]. Wenyon has recently been able to confirm LAVIER's observations.

During 1927, the author sent to KEILIN a series of blood films including some of a strain of *T. evansi* (*T. marocanum*) isolated by VELU in 1922, from a horse, and maintained by the author in rats and guinea-pigs, chiefly the latter. KEILIN remarked in a letter that the trypanosomes in the films of *T. evansi* appeared to be "ablepharoplastic"; an observation which was quickly confirmed by Wenyon. No change took place on subsequent passage of the strain through rats, and it is evident that in the course of its maintenance in laboratory animals the parasite had acquired the characters of *T. equinum*, 100 per cent. of the trypanosomes being "ablepharoplastic." It is not known when the change took place, but it was more than a year previously; the strain has not altered in virulence and it has never been used for the testing of drugs. It is clear, therefore, that the condition has arisen spontaneously. Wenyon briefly discusses various hypotheses which may possibly explain the phenomenon.

W. Y.

LAVIER (G.). Existence de formes naturellement "ablépharoplastiques" chez *Trypanosoma evansi* et *Trypanosoma equiperdum*. [**Blepharoplastless Forms in Nature of *T. evansi* and *T. equiperdum*.**].—*C.R. Soc. Biol.* 1928. May 18. Vol. 98. No. 15. pp. 1320–1321. [1 ref.] [Parasit. Lab., Faculty of Med., Paris.]

The author has succeeded in finding individuals without a parabasal body (blepharoplastless) in a strain of *T. equiperdum* and in four strains of *T. evansi*. The proportion of these forms present varied in the different strains from 0.4 to 8.0 per cent. These figures are approximately the same as those obtained in the case of various strains of trypanosomes of the *brucei* group, and the author believes indicate the close relation of the species.

W. Y.

SAITO (Masayuki). Cytologische Studien über Trypanosomen, bsd. über die Einwirkung von verschiedenen Heilmitteln, Röntgen- und ultra-violetten Strahlen auf Trypanosomen. [**Cytological Studies on Trypanosomes, particularly the Action of Various Drugs, and Röntgen and Ultra-Violet Rays.**]—*Fukuoka Ikwadai-gaku-Zasshi*. (*Fukuoka Acta Med.*) 1927. July. Vol. 20. No. 7. German summary pp. 52-54. [In Japanese.]

The division of the nucleus of trypanosomes is by a process of mitosis. Röntgen rays had no effect on the trypanosomes. Ultra-violet rays were active *in vitro*, the trypanosomes becoming motionless in two to three hours. Human serum had a definite trypanocidal action *in vivo*. In contrast to previous workers, the author states that human serum has a definite action *in vitro*. A strain of *T. gambiense*, which had been preserved in mice for years, was influenced by human serum. The trypanocidal substance was found to be decreased in the placental blood of pregnant women, and in individuals with disease of the liver and icterus. Pleural and peritoneal fluids contained trypanocidal substance. The active substance is in the euglobulin- and pseudoglobulin- fractions, and not in the fibrinoglobulin- and albumen-fractions. If human serum is injected into animal organisms when secretion of trypanocidal substance from leucocytes is taking place, the trypanocidal action of the human serum is still more powerful. The trypanocidal body of human serum has antigen capacities.

Morphological observations were made on the action of various drugs, of human serum, and of ultra-violet rays, on trypanosomes; the drugs employed were atoxyl, neosalvarsan, "Bayer 205," tartar-emetic, parafuchsin, trypaflavin, pyronin, trypanblue and trypanred. Most of the drugs, and the human serum and ultra-violet rays, acted on the cytoplasm, and tartar emetic alone had a damaging action on the nucleus. Parafuchsin, trypaflavin and pyronin caused the blepharoplast to disappear. "Bayer 205," parafuchsin and trypanred at first stimulate and later paralyse. "Bayer 205" stimulates division of the nucleus and frequently trypanosomes with four to six nuclei are found. The appearance of granules and vacuoles in the cytoplasm, and of rounded forms, signifies a degeneration of trypanosomes. Many rounded forms appear after the administration of tartar emetic. Trypaflavin caused the appearance of intensive granular formation. The origin of these granules is very doubtful. Formation of the vacuole close to the blepharoplast is a specific phenomenon indicating damage to the trypanosome. The blepharoplasts of arsenic-fast and serum-fast strains appear to be more strongly resistant to trypaflavin than the blepharoplasts of the original strains.

W. Y.

SAITO (Masayuki). Das Blutbild der mit Trypanosomen geimpften Tiere. [**The Blood Picture in Trypanosome infected Animals.**]—*Fukuoka-Ikwadai-gaku-Zasshi*. (*Fukuoka Acta Med.*) 1927. Nov. Vol. 20. No. 11. German summary pp. 84-85. [In Japanese.]

The author describes the changes of the blood found in rabbits and mice infected with *T. equiperdum* and *T. gambiense*. There was a decrease of the number of erythrocytes and this was accompanied by a decrease in their haemoglobin content. In rabbits at the beginning of the infection pronounced leucocytosis is to be seen. This is followed by a slight leucopenia with lymphocytosis. Towards the end of the infection there is a

definite leucocytosis with an increase of pseudo-eosinophile cells and a decrease of lymphocytes. The Arneth count shows a displacement towards the left; cells of the first and second class being strikingly increased. The variation in the number of leucocytes is not related to the appearance of trypanosomes in the circulating blood.

In mice there is a sudden increase in the number of white corpuscles, but towards the end of the infection a tendency in the opposite direction. Following an injection of atoxyl there is a leucocytosis of short duration.

W. Y.

CAMPOS (Ernesto de Souza). [In Portuguese & English.] Estudos sobre uma raça neurotópica de *Trypanosoma cruzi*. **Studies upon a Neurotropic Strain of *Trypanosoma cruzi*.**—*Ann. da Faculdade de Med. de S. Paulo*. 1927. Vol. 2. In Portuguese pp. 197–199. In English pp. 199–201. With 5 figs. on plates. [Microb. Lab., Faculty of Med., S. Paulo, Brazil.]

This investigation was undertaken with the object of throwing light on the nervous type of infection in Chagas's disease. It was suggested by the observation of VILLELA, who noticed pronounced nervous symptoms in a number of infected dogs.

The author inoculated adult dogs from infected puppies and guinea-pigs, and in a second series of experiments dogs were infected by inoculation of trypanosomes obtained from *Triatoma megista*. In addition to dogs, rabbits were also experimentally infected. Nervous phenomena were observed and focal inflammatory lesions containing parasites were seen in sections of the spinal cord. Investigations showed that the tendency to nervous system involvement was in no way modified by prolonged cultivation of the parasites *in vitro*. A brief description is given of the character of the lesions in the spinal cord.

W. Y.

LEDER. Beitrag zur Kenntnis der trypanoziden Substanz im Blutserum bei Hämophilie. [**The Trypanocidal Substance in the Blood Serum of Haemophiliacs.**]—*Muench. Med. Woch.* 1928. Mar. 30. Vol. 75. No. 13. p. 562.

Reference is made to the observation of OPITZ* and ZWIG that in several cases of haemophilia the serum lacked its protective power when injected into mice infected with trypanosomes. This observation was confirmed by the author, who investigated the trypanocidal power of the serum in a family of haemophiliacs.

W. Y.

KLEINE (F. K.). Mein Anteil an der Schlafkrankheitsexpedition des Völkerbundes. [**My Share in the Sleeping Sickness Expedition of the League of Nations.**]—*Med. Klin.* 1928. Apr. 13. Vol. 24. No. 15 (1218). pp. 566–568. [2 refs.]

This article is simply a summary of the author's work whilst a member of the League of Nations Sleeping Sickness Commission. The matters dealt with are recorded in the Commission's reports and are referred to elsewhere in this *Bulletin*.

W. Y.

* OPITZ, Ueber die Hämophilie. *Ergeb. f. inn. u. Kinderkhh.* Bd. 29.

CHEVALLIER (Paul) & LÉVY (G.). Un cas de "trypanides," éruption précoce de la maladie du sommeil. [**Early Skin Eruption in Sleeping Sickness.**]—*Bull. Soc. Française Dermat. et Syph.* 1928. Mar. No. 3. pp. 185–187.

The clinical details are given of a case of sleeping sickness contracted in the Congo and special reference is made to the cutaneous eruption.

W. Y.

JOYEUX (Ch.). Les récentes acquisitions sur le traitement de la maladie du sommeil. [**Recent Experience of the Treatment of Sleeping Sickness.**]—*Presse Méd.* 1928. June 9. Vol. 36. No. 46. pp. 731–732.

This is a general revue of the action of drugs recently introduced for the treatment of sleeping sickness. It contains nothing new.

W. Y.

MEDICAL ZOOLOGY.

EWING (H. E.). **Observations on the Habits and the Injury caused by the Bites or Stings of Some Common North American Arthropods.**—*Amer. J. Trop. Med.* 1928. Jan. Vol. 8. No. 1. pp. 39-62. With 4 text figs. [6 refs.] [U.S. Bureau of Entomology, Washington, D.C.]

With the notorious exception of *Lathrodectes mactans*, the "black widow" spider, the species of arthropoda considered in this paper are not very seriously hurtful. The Buthid scorpion *Centruroides vittatus* inflicts a wound little worse than a bee's sting. The "whip scorpion" *Mastigoproctus giganteus* is as innocuous as all the other species of his tribe elsewhere. The bite of the big Mygalid spiders *Eurypelma californica* and *Pamphobeteus*, causes nothing more than a transient smart, and that of the kindred trap-door spider *Pachylomerus audouinii* causes some slight numbness in addition. Of three species of wolf spiders mentioned the worst (*Lycosa* sp.) causes little more hurt than a bee. The "black widow," however, is in a different category (see this *Bulletin*, Vol. 23, p. 875, and Vol. 24, pp. 401, 895, 896). The long-legged centipede *Scutigera forceps* is not to be feared for its bite, but may be appreciated as a destroyer of bed-bugs. *Benacus griscus*, one of the giant water-bugs, emits its saliva with a will, and its bite causes a burning pain and some local swelling and hyperaemia. The bite of the Reduviid bug *Nabis rosipennis* is said to be like that of a mosquito and to cause irritation that may be felt and seen two days afterwards.

A. Alcock.

MACKERRAS (I. M.). **The Mosquitoes of the Sydney District.**—*Rep. of Director-General of Pub. Health New South Wales for Year 1926.* pp. 165-168.

The list of 27 mosquitoes of the Sydney District includes *Culex fatigans* and *Anopheles annulipes*, *atrripes*, and *stigmaticus*, but explicitly repudiates *Aedes argenteus*. Mosquito-borne disease is a negligible quantity, but the prevalent domestic *Culex fatigans* and salt-marsh *Aedes vigilax* are pests. The use of mosquito-nets gives good protection against them, and it is doubtfully justifiable to attempt to control breeding-places while the housefly, which is vastly more important, is allowed to thrive.

A. A.

NEWSTEAD (R.) & CARTER (H. F.). **Mosquitos on Ships arriving in the Port of Liverpool from West Africa.**—*Ann. Trop. Med. & Parasit.* 1927. Dec. 31. Vol. 21. No. 4. pp. 419-423.

Between May, 1920, and March, 1921, twenty-two ships arriving in Liverpool from West African ports were seached to exhaustion, and as soon as possible—often a few hours—after arrival, for living mosquitoes. In only one ship of them all were any found—3 female *Culex fatigans*. Two of these were brought ashore, and were kept in a very congenial environment where one of them lived for 31 days, and the other for 60 days, without biting and without laying eggs. The ship in question

had been invaded by mosquitoes when lying about half-a-mile off Port Gentil, and mosquitoes had been active on board up to a two days' run from Liverpool.

A. A.

HAMLIN-HARRIS (Ronald). **The Relation of Certain Algae to Breeding Places of Mosquitoes in Queensland.**—*Bull. Entom. Res.* 1928. May. Vol. 18. Pt. 4. pp. 377-389. [14 refs.]

This is an interesting and judicious paper and should be read and digested. The author's observations and experiments during a term of 18 months with two species of *Nitella* lead him to conclude that Characeae do not possess any inherent larvicidal properties. On the other hand he finds that *Cladophora holsatica*, one of those algae that forms cushions and floating balls and also gives off a repulsive odour, does inhibit the growth and development of larvae. The examination of a large number of waterholes in which no larvae—sometimes no living things of any sort—were to be found countenances the opinion that ferrous oxide and salts of alumina are interdictive. The attractiveness of *Spirogyra nitida* and other green Confervoids as food for Anopheles larvae is noticed.

A. A.

SENIOR-WHITE (Ronald). **Algae and the Food of Anopheline Larvae.**—*Indian J. Med. Res.* 1928. Apr. Vol. 15. No. 4. pp. 969-988. With 1 coloured plate. [14 refs.] [Central Malaria Bureau, Kasauli.]

The author finds, by comparing the plankton of the medium with the contents of the gut of anopheline larvae living in it, that the larvae feed upon whatsoever organism occurs in greatest abundance, although there is evidence of a preference for diatoms and, perhaps, spores of fungi. By comparing the increase or decrease of organisms in pure cultures in which anopheline larvae were browsing and in similar cultures that were vacant, he estimates that anopheline larvae have a filtration-capacity of about 200 to 1,000 cmm. of water per diem according to age. He finds also that in temporary rain-pools the greatest concentration of plankton is some millimetres below the surface—more convenient for culicine than anopheline larvae. He also finds that copper-sulphate, even in concentrations much greater than are permissible in the field, is not effective against certain species of algae.

A. A.

BARBER (M. A.) & KING (C. H.). **The Tadpole of the Spadefoot Toad an Enemy of Mosquito Larvae.**—*Public Health Rep.* 1927. Dec. 30. Vol. 42. No. 52. pp. 3189-3193. With 2 text figs. [2 refs.]

The Batrachian tadpole living in natural conditions is usually herbivorous, but the authors have observed tadpoles of the spadefoot toad, *Scaphiopus hammondi*, a N. American and Mexican species, to feed freely on mosquito larvae—and not merely when placed with

the larvae in a pan [where, possibly, the hungry tadpoles had nothing else to eat and might have fed upon their own kind], but also when let loose in a borrow-pit containing mosquito larvae and crustaceans [where, presumably, the tadpoles had a choice of vegetable food]. Barber also mentions evidence of his own, of tadpoles in the Philippine Islands eating mosquito larvae. In discussing the utility of colonizing *Scaphiopus* the authors do not fail to observe that its habitat is in temporary pools, and that its season is early in the summer and short [these particulars presumably refer to the (significant) tadpole stage].

A. A.

NEWHAM (H. B.). **A Simple Preventive of Mosquito Bites.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1928. Feb. 25. Vol. 21. No. 5. p. 427. [London School of Hyg. & Trop. Med., London.]

A lady in the Madras Presidency states that she repels mosquitoes with infinite comfort by applications of the juice of the common Indian lime (*Citrus acida*). She slices a fresh lime and rubs the cut surface well over parts liable to be bitten, letting the juice dry on the skin.

A. A.

LEGENDTRE (J.). La lutte contre les moustiques par la concurrence larvaire entre zoophiles et androphiles. [**Larval Association of Zoophiles and Androphiles in the Fight against Mosquitoes.**]—*C.R. Acad. Sci.* 1927. Dec. 19. Vol. 185. No. 25. pp. 1520–1522.

The author repeats the story of his having carried eggs and larvae of a strictly "zoophile and androphobe" race of *Culex pipiens* from Portrieux in Brittany to Pons, where the local race of *Culex pipiens* was violently and vexatiously "androphile," in the hope that the "androphobe" immigrants would evict the noxious "androphile" natives—a hope that was fulfilled the very next year. He now, three years afterwards, can find only "androphobe" mosquitoes at Pons in such places as he has examined. The supposition appears to be that the struggle between the misanthropes and the philanthropes occurs in the larva stage.

A. A.

MATHESON (Robert) & HINMAN (E. H.). ***Chara fragilis* and Mosquito Development.**—*Amer. J. Hyg.* 1928. Mar. Vol. 8. No. 2. pp. 279–292. With 1 chart. [22 refs.] [New York State College of Agric., Cornell Univ., Ithaca, N.Y.]

While studying the mosquitoes of central New York, Matheson came upon "a deep spring-fed pool," having a rich growth of *Chara fragilis*, and quite devoid of mosquito larvae, although separated only by an embankment from a marshy lake where larvae of *Anopheles* and *Culex* were to be found in considerable numbers. The said pool was kept under observation for two summers, "but no mosquito

breeding occurred in it," although it contained an abundant plankton. (It should be noted that the pool was on higher ground than the lake, into which it had a constant outflow.)

Some of this *Chara* was transferred (*a*) to a wooden pail filled with unfiltered water "to which were added leaves," and (*b*) to a wooden pail "filled with water," and these two pails were sunk in the ground near 4 similar pails "filled with unfiltered water well supplied with decaying leaves," but not containing *Chara*—for control. In all these pails *Culex territans* appears to have dropped its eggs, and the eggs hatched; but whereas in the 4 control pails the larvae consummated their development, in the *Chara* pails "none succeeded in pupating." Subsequently, during the summer, eggs (of this *Culex*) were dropped constantly in the control pails, but not in pail *a*, where the *Chara* continued to flourish. Larvae of *Anopheles punctipennis* did, however, appear in pail *b*, where the *Chara* did not flourish well, and these larvae attained their adult wings.

While these experiments were in progress some *Chara* "was added to a pail containing rainwater and developing larvae of *Culex territans*," and "the larvae continued their development and numbers transformed, but how many was not determined." Subsequently—75 days after—eggs of this species appeared in this pail and hatched, but died in 2 or 3 days; still later larvae of *Anopheles punctipennis* were found in it "but none were observed to transform to pupae."

From the above experiments the authors concluded that *Chara fragilis* appears to be both larvicidal and repellent to mosquitoes. In further experiments—which are tabulated and not individually described—the authors put large numbers of larvae of several (4) species of mosquitoes into vessels containing *Chara*, with water from a stream known to them to be suitable for mosquito breeding, and they found in the course of 44 experiments that in every instance there was a great mortality of larvae, and that in 22 experiments not a single adult emerged. Furthermore, they placed five cages, made of mosquito-netting 14 meshes to the inch, in the pool where the *Chara fragilis* was found to begin with; four of the cages contained 300 larvae in various stages of development, and one contained 500 very young larvae. These cages were examined three, ten, and 17 days afterwards: at the first examination larvae were present in all the cages except the one containing the very young ones, and one adult was also observed; at the second examination three adults were seen, but it was difficult to find larvae in any of the cages: at the fourth examination neither "living larvae nor adults could be found in any of them."

Experiments with dried *Chara fragilis* followed, large numbers of larvae being placed in vessels containing "ordinary stream water" (2 litres) and finely-powdered *Chara* then added. Small larvae by the hundred were killed off altogether, in less than four days, by the addition of 4 gm. of *Chara* powder, and there was also a mortality ranging from 19.5 to 82 per cent. among large larvae with doses varying from 1 to 4 gm. "Water taken from *Chara* aquaria of known lethal activity has no apparent retarding or lethal action on larval development."

"The lethal action of this plant [*Chara fragilis*] would seem to be closely associated with high pH. The pH seems to vary directly with the degree of photosynthetic activity."

A. A.

BARBER (M. A.). **The Food of Culicine Larvae. Food Organisms in Pure Culture.**—*Public Health Rep.* 1928. Jan. 6. Vol. 43. No. 1. pp. 11–17. [2 refs.]

Having very successfully reared *Anopheles* larvae, hatched from sterilized eggs, on pure cultures of bacteria alone, infusoria alone, and algae alone, the author has since carried on the same process equally successfully with larvae of *Culex quinquefasciatus* and *Aedes aegypti* on these pure cultures and also on pure yeast. In rearing other species he has also used cultures of mixed bacteria and combinations of the above cultures with satisfaction. The material must be living; "no considerable growth of larvae was obtained in sterile nutrient media or in cultures provided only with dead organic material." Success did not appear to depend upon a strict observance of H ion concentration.

A. A.

DUNN (Lawrence H.). **Further Observations on Mosquito Breeding in Tree-Holes and Crab-Holes.**—*Bull. Entom. Res.* 1928. Feb. Vol. 18. Pt. 3. pp. 247–250.

Observations on two tree-holes were carried on in a compound at Yaba in Nigeria. The holes were examined at five-day intervals for a term of 325 days. One hole, about two inches in diameter and $6\frac{1}{2}$ inches deep and leading into a cavity shaped like a bottle with a capacity of about 355 cc., was in the fork of a shady dika-nut tree and about $3\frac{1}{2}$ feet from the ground; water was found in it at 32 of the 66 examinations and mosquito larvae at 30; from all these larvae 430 adults were reared—4 being *Aedes aegypti*. The other hole formed a basin 8 inches in diameter and $3\frac{1}{2}$ inches deep and about 900 cc. capacity, in the top of a sprouting stump (about 3 feet high) of a mango-tree, and was not always shaded; water was collected in it at 34 of the examinations, and mosquito larvae at 32; from the larvae 875 adults were reared, 218 being *Aedes aegypti*.

Observations of 200 crabholes along the margin of a lagoon at Lagos in Nigeria were made during a term of about 3 months, the water being sucked out from the depths of the hole. Mosquito larvae were found in 113 holes, from which 4,356 adults were reared, including 26 *Anopheles gambiae*, 10 *Aedes aegypti*, and 17 *Culex fatigans*.

A. A.

RUDOLFS (W.). [Investigations of Mosquito Problems carried on at the New Jersey Agricultural Experiment Stations during the Past Year.]—*Proc. 13th Ann. Mtg. New Jersey Mosquito Exterm. Assoc., Atlantic City, 1926.* New Brunswick, N.J. pp. 33–54. [6 refs.] [Summarized in *Rev. Applied Entom.* 1927. Nov. Vol. 15. Ser. B. Pt. 11. pp. 199–200.]

The cause of the disappearance of oil applied to a river polluted with sewage was attributed mainly to hydrocarbon-digesting bacteria—shown by appearance of sugar and soluble starches. Of mosquito repellents thuja oil, cinnamic-aldehyde, anisic-aldehyde, bergamot oil, clove oil, and pyrethrum-extract were found the most effective; when mixed with an ointment the protective effect lasts 2–3 hours. The observations here recorded confirm the commonsense conclusion that a suitable food-supply for the larvae is the chief factor in mosquito-breeding waters and that this is determined by the chemical composition of the water.

A. A.

EDWARDS (F. W.) & GIVEN (D. H. C.). **The Early Stages of some Singapore Mosquitoes.**—*Bull. Entom. Res.* 1928. May. Vol. 18. Pt. 4. pp. 337–357. With 9 text figs. [British Museum, Nat. Hist., London, S.W. 7.]

Interesting entomological detail; among other items are the results of an investigation of the mosquito-life of pitcher-plants (Nepenthaceae). Many thousands of larvae, representing 16 species of mosquitoes (6 *Culex*, 3 *Armigeres*, 3 *Rachionotomyia*, 2 *Uranotaenia*, a *Megarhinus*, and on one occasion an *Anopheles*) were found in the large number of *Nepenthes* pitchers examined.

A. A.

NITZULESCU (Virgil). Contribution à l'étude de la pompe salivaire des culicides [**The Salivary Pump of Culicidae.**]—*Bull. Soc. Path. Exot.* 1927. Nov. 9. Vol. 20. No. 9. pp. 851–857. With 6 text figs. [4 refs.] [Parasit. Lab., Faculty of Med., Paris.]

The salivary pump of Culcids is here considered in very particular detail and compared with that of Tabanids and Simuliids—and also with the descriptions of previous authors.

A. A.

KLIGLER (I. J.). **Simple Method of feeding Stegomyia on Blood or Mixtures containing Cultures.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1928. Jan. 31. Vol. 21. No. 4. pp. 329–331. With 1 text fig. [Dept. of Hyg., Hebrew Univ., Jerusalem.]

A successful method of infecting *Stegomyias* with *Leptospira icteroides* by getting them to feed on suspensions (in defibrinated or citrated blood) of cultures of that organism is here described. The insects to be infected are confined (2 to 4 at once) in a wide-mouthed sterile test-tube, the mouth of which is made taut (in the usual way) by a stretch of fine-meshed sterile cotton-gauze instead of by a plug of cottonwool.

The feeding is carried out as follows:—

“A small quantity of a young active culture is added to defibrinated or citrated blood, the two thoroughly mixed, and small amounts of the mixture placed in small sterile petri dishes. The tube containing the mosquitoes is held at first with the gauze to the light so that the insects come to rest on the gauze. Without disturbing them the tube is lowered carefully into the blood mixture so that the gauze comes in contact with the blood. If conditions are favourable, some or all of the mosquitoes usually begin to feed almost at once, and in a few minutes become partly or completely engorged. The fully engorged mosquitoes may then be transferred to a cage and the rest dissected in order to see the condition of the blood and the leptospira in the gut. As a rule the non-engorged mosquitoes, and even those which apparently had not fed, contained varying quantities of blood, and many active leptospira could be demonstrated in the gut contents examined with the dark field. The partially engorged mosquitoes will readily complete their feed on man or animal, should that be desired. At various intervals after feeding, they may be dissected or fed on animals, as the case may be. It may be of interest to note here that an engorged mosquito has taken up, approximately, one to two mgm. of blood. To avoid introducing foreign solid matter into the mosquito, liquid cultures, or the supernatant suspension of centrifugalized semi-solid cultures, should be used. Either defibrinated or citrated blood may be employed, but, when citrated blood is the food, it is

desirable to keep the concentration of citrate down to 0.2 per cent. (the minimum necessary to prevent clotting in the test-tube), since higher concentrations of citrate are injurious to leptospira.

It is best to hold the tube in an inclined position so that only part of the gauze is moistened by the blood."

A. A.

ROUBAUD (E.). L'éclosion de l'oeuf et les stimulants d'éclosion chez le *Stegomyia* de la fièvre jaune.—Application à la lutte antilarvaire. [**Hatching of Egg and Stimulants thereto in the Yellow Fever *Stegomyia*.**]—C.R. Acad. Sci. 1927. June 13. Vol. 184. No. 24. pp. 1491-1492. [3 refs.]

It is well known that eggs of many species of *Aedes*, including *Ae. argenteus* (*Stegomyia fasciata*), may remain alive and unhatched for many months. According to the author, the eggs of *Ae. argenteus* are of two kinds, both of which may occur in the same batch. Those of the one kind hatch in 3 or 4 days, without any special stimulus, and even if placed in sterile water. The other and commoner kind of eggs do not hatch for months, and then only under the influence of some special stimulus, biochemical or chemical—usually a microbiotic ferment. Experimentally, a weak solution of sodium hypochlorite is almost as efficacious as a ferment. The author, therefore, is of opinion that since these resistant eggs will survive antilarval treatment in a yellow fever area, "detective" operations with a 0.1 per cent. solution of sodium hypochlorite are an essential preliminary of yellow fever prophylaxis.

A. A.

GALLIARD (Henri). Contribution à l'étude des culicidés d'Espagne. [**Culicidae of Spain.**]—*Ann. Parasit. Humaine et Comparée*. 1928. Apr. 1. Vol. 6. No. 2. pp. 206-210. With 2 text figs. [Anti-Malarial Inst., Navalmoral de la Mata, Spain, & Parasit. Lab., Faculty of Med., Paris.]

The author mentions the larvae of several species of *Culex* found in waters in central Spain that are also inhabited by *Anopheles maculipennis* and *hispaniola*, which are the only anophelines found there by him. Further south, in the Morena mountains, *Culex mimeticus* seems to be intimately associated with *A. hispaniola*.

A. A.

MARTINI (E.), IRFAN (J.), MAHMUD (S.) & VOGEL (R.). Beiträge zur Stechmücken- und Malariakunde Anatoliens. [**Contributions to the Knowledge of the Mosquitoes and Malaria of Anatolia.**] I. Stechmückenfangplätze in Anatolien. 1926 [IRFAN & VOGEL].—*Abhandl. a.d. Gebiet d. Auslandskunde. Hamburg. Univ.* 1927. Vol. 26 (D., Med. & Vet. Vol. 2.) [Festschrift NOCHT.] pp. 286-292; II. Beiträge zum Studium der Morphologie und Biologie der Anopheleslarven in der Umgebung von Aidin [MAHMUD].—*Ibid.* pp. 292-298; III. Ueber die Ökologie der Anopheleslarven in der Umgebung von Aidin [MAHMUD].—*Ibid.* der Anophelen in Anatolien [VOGEL & MARTINI].—*Ibid.* pp. 298-308; IV. Einiges ueber die Malariaverhältnisse in Anatolien [MARTINI].—*Ibid.* pp. 308-313.

These careful studies, reported in great detail, are for the most part of local interest for Anatolia. Thirty-eight species of Culicidae

are here, for the present, recorded from that province, of which 8 are Anophelines, namely, *A. bifurcatus*, *algeriensis*, *nigripes*, *sinensis*, *multicolor*, *maculipennis*, *elutus*, and *superpictus*. Of these only the last three are of real importance in connexion with malaria, they being abundant, of wide occurrence, and of house-haunting habit. *A. bifurcatus*, a not unimportant species elsewhere, may here be only a localized danger in certain thinly-peopled mountainous parts. The natural breeding-places in the neighbourhood of Aidin are described in great detail; those of *maculipennis* and *elutus*—the larvae of which species are commonly found together all the year round—are in open, standing water of no great depth; those of *superpictus* are in pools in the beds of brooks and streams, and as such pools are plentiful only in summer when the streams are running low, the larvae of this species are found only at that season. The malaria of Anatolia is simple tertian and subtertian; quartan was not observed. It is not uncommon to find villages where nearly all the children examined are infected. Malarial cachexia is common. Quinine-resistant cases are to be met with, and the Turkish doctors think that concurrent helminth-infestation may dispose to such resistance. Blackwater occurs, but is not very common. The effects of local seasonal occupations and habits upon the local incidence of malaria is discussed at length.

A. A.

BALFOUR (Marshall C.). **Studies on the Bionomics of North American Anophelines. Winter Activities of Anophelines in Coastal North Carolina (36° N. Lat.).**—*Amer. Jl. Hyg.* 1928. Jan. Vol. 8. No. 1. pp. 68-76. With 2 charts. [4 refs.]

These observations relate to certain coast tracts of N. Carolina lying about 36° N. There *Anopheles quadrimaculatus* and *punctipennis* pass the winter both as larvae and as adults and *A. crucians* as larva and probably as adult also. The larvae in 1926-27 stood a spell of several days of three-inch ice on all breeding-places, and a ten-day spell having a mean minimum of -4° C. and an absolute minimum of -11° C.

A. A.

BOYD (Mark F.) & FOOT (Helen). **Studies on the Bionomics of American Anophelines. The Alimentation of Anopheline Larvae and its Relation to their Distribution in Nature.**—*Jl. Preventive Med.* 1928. May. Vol. 2. No. 3. pp. 219-242. With 10 text figs. [3 refs.] [Station for Field Studies in Malaria, Edenton, North Carolina.]

These studies on the nature of the food of the larvae of *Anopheles quadrimaculatus* and *punctipennis* in North Carolina were continued for three terms of four months each. The fourth stage larvae of these species appear to ingest the same elements of the plankton, the commonest of a multitude of elements being the protozoa, Trachelomonas and Arcella; the green algae, Eugloena, Closterium, and Cosmarium; and the diatom Navicula. Despite this similarity in tastes *quadrimaculatus* larvae are found "chiefly in situations where the variety of food is relatively greatest" (ponds and waters with imperceptible current), and *punctipennis* larvae "in situations where the range of their diet is relatively lower" (moving waters). The

authors think that the richer plankton of ponds may be attributable to their water being warmer than that of streams, and therefore conclude that the distribution of *A. quadrimaculatus* and *punctipennis* is not controlled by nutritional factors, but that perhaps causes of a thermal nature may exercise an important influence.

A. A.

HOFFMANN (Carlos C.). Zur Kenntnis der Anophelen Mexikos. [**A Notice of the Anopheles of Mexico.**]—*Abhandl. a.d. Gebiet d. Auslandskunde. Hamburg. Univ.* 1927. Vol. 26. (D., Med. & Vet. Vol. 2.) [Festschrift NOCHT.] pp. 184–196. With 5 figs. on 2 plates. [Dept. of Public Health, Mexico.]

Of the eight species of *Anopheles* occurring in Mexico—*A. crucians*, *A. quadrimaculatus*, *A. punctipennis*, *A. albimanus*, *A. pseudopunctipennis*, *A. vestitipennis*, *A. argyrotarsis*, *A. strigimacula*, *A. apicimacula*, *A. neivai*, and *A. ciseni*—the first three belong to the northern part of the country and the other five mainly to the southern part. The local distribution of these species is here considered in great detail. *A. albimanus* and *A. pseudopunctipennis* are declared to be, in respect of malaria, the most dangerous species for Mexico; the former is the commonest species along the entire extent of both coasts of the country in the rainy season, the latter frequents less humid tracts. *A. vestitipennis* and *A. argyrotarsis* are dangerous in certain localities, especially in the south-east of Mexico, but the other four southern species are regarded by the author as not important.

A. A.

ROUBAUD (E.). Nouvelles recherches sur l'évolution zoophile des faunes d'anophèles en Europe (*A. maculipennis*) d'après les données de l'armement maxillaire. [**The Maxillary Armament of Anopheles in Europe.**]—*Ann. Inst. Pasteur.* 1928. May. Vol. 42. No. 5. pp. 553–618. With 16 text figs. [20 refs.]

Roubaud's theory of a "zoophile" or "zootropic" race of *Anopheles maculipennis* was reviewed in this Bulletin for 1922 (Vol. 19, pp. 476–478) and is here again expounded, and expanded. A "zootropic" race is one the females of which, having become adapted for feeding exclusively on stalled beasts, will not touch man, and therefore are innocent of malarial infection. These "zootropic" females are distinguished by their maxillae, the denticles of which, having to pierce an animal hide, are more numerous than those of the *Anopheles* that habitually feed on thinner-skinned man—their number under the constant conditions of "zoophile" existence being 15. In "non-zoophile" races of *Anopheles maculipennis*—races that in the absence of cattle feed precariously, and commonly prey on man—the number of maxillar denticles is less than 14; or, in places where there appears to be a choice between cattle and man, yet owing to the paucity of cattle the exercise of that choice is restricted, the number of maxillar denticles may under the stress of competition for cattle-blood vary up to 16 or 17.

The argument set forth in the present paper is that the "zoophile" or "zootropic" modification of *Anopheles maculipennis* (with its exact maxillar denticular formula 15) has come about almost mechanically from the constant conjunction of two favouring circumstances

unwittingly provided by man in his efforts to improve the sanitation of agricultural tracts liable to flooding. In such tracts man, by collecting and bounding the surface waters, has established equable breeding-grounds for a settled population of these mosquitoes, and by installing permanent herds of cattle in propinquity to these breeding-grounds has provided the female insects with a constant, abundant and convenient supply of their favourite food. Everything is explained by this uniform constancy of an ideal environment; for, in the author's phrase, "zoophily" has been evoked and perfected *pari passu* with improvement in the conditions of existence for man, domestic animals, and mosquitoes all alike--a happy solution of the riddle of the painful earth.

A. A.

WILLIAMSON (K. B.). **Mosquito Breeding and Malaria in Relation to the Nitrogen Cycle.**—*Bull. Entom. Res.* 1928. May. Vol. 18. Pt. 4. pp. 433-439. [17 refs.]

An interesting argument supporting the general conclusion that deficient oxidation of waters containing excess of nitrogenous matter is fatal to higher forms of aquatic animal life, and approving the suggestion made many years ago by Sir Malcolm WATSON that dangerous *Anopheles* might be overcome by convenient pollution of their breeding-waters.

A. A.

GUELMINO (D.). Beitrag zum Studium der Biologie der Anophelen in Mazedonien. [**Biology of *Anopheles* in Macedonia.**—*Arch. f. Schiffs- u. Trop.-Hyg.* 1928. Feb. Vol. 32. No. 2. pp. 87-91. [Hyg. Inst., Skoplje.]

A study of the biology of *Anopheles maculipennis*, *superpictus*, and *bifurcatus* in Macedonia.

In some parts of Macedonia *A. maculipennis* contributed 46 per cent. of the hibernating *Anopheles* collected. During hibernation the female is passive until about the middle of January; thereafter the ovaries begin to grow, and eggs are laid about the middle of March, the inundated state of the country being then most auspicious. Males of the first generation of the year are seen about the end of April. Numbers attain their maximum at the end of May and first half of June and then as the country dries up they decrease. Of 2,000 hibernating females dissected not a single one yielded sporocyst or sporozoite.

A. superpictus hibernates in stables in company with *maculipennis*, forming 54 per cent. of the collection in the winter of 1926-27. The ovaries do not begin to ripen until the middle of February. Eggs are laid about the middle of April, in streams. The adults of the first generation show up in May, but after the middle of that month their numbers are suddenly checked, this being due to the fact that the streams in which the larvae live are swollen by the spring rains and overflow their banks, sweeping away many larvae to destruction. In June, with the onset of hot dry weather, regular conditions are again established for the secure multiplication of this species. Of 2,000 hibernating females examined none gave evidence of malarial infection.

A. bifurcatus, which is widely spread in Macedonia, hibernates there as elsewhere in the larval stage. Eggs are deposited in October, and the larvae reach their third or fourth stage early in winter; then they remain quiet at the bottom of the water until the latter half of February. The first generation of adults appears at the end of March or beginning of April.

A. A.

BARRAUD P. J.) & COVELL (G.). **The Morphology of the Buccal Cavity in Anopheline and Culicine Mosquitoes.**—*Indian Jl. Med. Res.* 1928. Jan. Vol. 15. No. 3. pp. 671–680. With 50 figs. on 8 plates. [1 ref.] [Central Malaria Organization, Kasauli, India.]

This investigation of the buccal cavity of the female in 86 species and 3 varieties of Anophelines and 48 species of Culicini was made with the object of determining the condition of the buccopharyngeal armature described in an earlier paper by SINTON and COVELL.

In respect of the Anophelines it is found that in 30 of the species, including representatives of the *Anopheles* (s.s.), *Myzorhynchus*, *Bironella*, *Christya*, and *Aribalzagia* sections, the buccopharyngeal armature is absent; that in 14 of the species, including representatives of the *Myzomyia*, *Neomyzomyia*, and *Nyssorhynchus* sections, it consists of a single row of 8 to 10 (in two cases 12 to 14) large separate teeth; that in 4 of the species, namely, *A. argyrotarsis*, *brasiliensis*, *albimanus* and *tarsimaculatus*, it consists of two rows of teeth very much and characteristically recurved; that in 28 species, including representatives of the *Myzomyia*, *Nyssorhynchus*, *Neocellia*, and *Cellia* sections, it consists of a double row of teeth with 12 to 14 in each row; and that in 13 species, including representatives of the *Myzomyia*, *Pseudomyzomyia*, *Neomyzomyia*, and *Cellia* sections, it consists of a double row of 18 to 26 (in two cases 14 to 16) in each row. Thus it is found that species having strong general resemblances [and justly for that reason being regarded as closely akin] may differ in this one point of the buccopharyngeal armature; [and this, of course, is only to be expected, since classification by a single arbitrarily-chosen character gives a notoriously deceptive indication of natural affinity and in the history of taxonomic zoology has again and again from of old led back to chaos].

A. A.

ADOWA (A. N.) & RAVITSCH-TSCHERBO (M. I.). Sur la teneur en oxygène des eaux tourbeuses. [**Oxygen Tension of Bog Waters.**]—*Russian Jl. Trop. Med.* 1927. Vol. 5. No. 10. French summary p. 675. [In Russian pp. 639–642. With 2 text figs. Refs. in footnotes.]

SMORODINZEW (J. A.) & ADOWA (A. N.). Sur la réfraction des eaux tourbeuses en rapport avec l'application de la réfractométrie en biologie.—*Ibid.* French summary p. 675. [In Russian pp. 635–638. Refs. in footnotes.]

The tenor of both these papers is confirmatory of observations previously published, that (*Sphagnum*) bog marshes, as compared with sedgy (*Carex*) marshes, are inhospitable to *Anopheles* larvae. Among the unfavourable factors of *Sphagnum* waters, as indicated

in the first paper, are a low oxygen tension concurrent with a high percentage of organic matter; and, as indicated in the second paper, a high refractive index along with a low mineral content.

A. A.

SEBENZOW (B. M.) & ADOWA (A. N.). Conditions biologiques et physico-chimiques qui règlent le cantonnement des larves d'*Anopheles maculipennis* dans les tourbières. [*Anopheles maculipennis* and its Relation to Peat Bogs.].—*Russian Jl. Trop. Med.* 1928. Vol. 6. No. 2. French summary pp. 142-143. [In Russian pp. 89-105. Refs. in footnotes.]

Peaty waters in the environs of Moscow are here stated to be of two types—Sphagnum (bog moss) waters and Carex waters. The former are too poor in aliment to support larvae of *Anopheles maculipennis*, the latter resemble lacustrine waters and are richer in life. Naturally, waters of intermediate character exist.

A. A.

RODENWALDT (Ernst). Kaart en determineertabel van de larven der anophelinen van Ned. Oost-Indië. [**Chart and Identification Key of Anopheline Larvae of Dutch East Indies.**].—1 folding table & 16 figs. on 2 folding plates. Uitgegeven door den Dienst der Volksgezondheid.

These charts include individual diagnoses and a key for the identification of the larvae of 16 species and varieties of *Anopheles* occurring in the Netherlands East Indies. Each diagnosis is illustrated by a very clear figure, enlarged about 25 diameters, of the anterior half (head, thorax, and first two abdominal somites) of the respective larva. In this series of figures the diagnostic features of each species are emphatically demonstrated, so that although all the text is in Dutch the identification of species is easy.

A. A.

INGRAM (Alexander) & DE MEILLON (Botha). **A Mosquito Survey of Certain Parts of South Africa, with Special Reference to the Carriers of Malaria and their Control. Part I.**—*Publications of the S. African Inst. for Med. Res.* 1927. Oct. Vol. 4. No. 22. 81 pp. With 53 figs.

The contents of this volume include mosquito surveys of certain parts of Northern Transvaal, and of the coastal belt of Zululand, and descriptions of new species of mosquitoes discovered in Zululand. The reports of the surveys include a notice of the physical features and meteorology of the districts surveyed and some account of places visited, and lists of the species of mosquitoes collected and bred. For the species of *Anopheles* details are given of the local incidence and breeding-grounds at the various places visited. In the northern parts of the Transvaal 13 species of *Anopheles* exist, namely, *mauritanus*, *squamosus*, *gambiae* (= *costalis*), *pretoriensis*, *rufipes*, *funestus*, *natalensis*, *transvaalensis*, *maculipalpis*, *longipalpis*, *rhodesiensis*, *theileri*, and *cinereus*. Thirteen species of *Anopheles* are also found in the coastal belt of Zululand, ten of them being identical with the first ten of the

Northern Transvaal list, the other three being *ardensis*, *nili*, and *pharoensis*. The species chiefly responsible for malaria both in the Transvaal and Zululand are *gambiae* (= *costalis*) and *funestus*.

A. A.

SWELLENGREBEL (N. H.) & DE ROOK (H.). Densité de la population et anophélisme. (**Density of Population and Anophelism.**)—*Riv. di Malariaologia*. 1928. Jan.-Feb. Vol. 7. No. 1. pp. 4-6. [1 ref.] [English summary pp. 80-81.] [Inst. of Trop. Hyg., Amsterdam.]

The authors determined (by fumigation) the numbers of *Anopheles* sheltered severally in piggeries situated at three stations in and near a rural area under continuous antilarva control with "liquid (paraffin) vaseline." Station No. 1 was in the middle of the controlled region, near a town; station No. 2 was near three isolated farms at the edge of the controlled region; station No. 3 was quite outside the controlled region and near a village; all three stations were carefully chosen as naturally equally attractive from the *Anopheles* point of view, except that No. 1 and No. 2 were near inhabited centres, and No. 3 included only three isolated farms.

The total counts of *Anopheles* during 4 months (June-September) were as follows:—

			Per sq. metre.	Per pig.
Station No. 1	...	...	16	92
„ No. 2	...	...	85	289
„ No. 3	...	...	48	264

The results, according to the authors' statement, confirm the conclusion of Ross that in an area where the numbers of *Anopheles* remain constant the number of *Anopheles* per head increases when the population decreases. At Station No. 2 the population was the least and the number of *Anopheles* the most.

A. A.

SHANNON (R. C.), DAVIS (N. C.) & DEL PONTE (E.). La distribución del *Anopheles pseudopunctipennis* y su relación con el paludismo en la Argentina. [**The Distribution of *A. pseudopunctipennis* and its Relations to the Prevalence of Malaria in the Argentine.**]—*Rev. Inst. Bacteriolog.* Buenos Aires. 1927. Mar. Vol. 4. No. 7. pp. 679-705. With 12 text figs. & 3 maps. [29 refs.]

The most important malarial zone comprises Jujuy, Salta and Tucumán, and small districts of Catamarca, La Rioja, San Luis, and north-west Córdoba—regions, with the exception of San Luis, where *A. pseudopunctipennis* thrives. Of less marked prevalence were the rivers Bermejo, Paraná and Paraguay and the adjacent provinces of Corrientes and Santa Fe. Here *Nyssorhynchus (albicansis, argyritarsis and albimaculatus)* appeared to be the vectors.

A. pseudopunctipennis breeds in permanent pools where there is much aquatic vegetation, in swamps formed by running water containing *Spirogyra*, in rice-fields, and generally in hilly districts where the water contains abundant algae.

The freedom of Buenos Aires from malaria is ascribed to the absence of *A. pseudopunctipennis*, the other species not being vectors there.

H. Harold Scott.

SHANNON (Raymond C.) & DAVIS (Nelson C.). Condiciones de reproducción de *Anopheles pseudopunctipennis* en la provincia de Tucumán durante la estación seca. [**Conditions of Reproduction of *A. pseudopunctipennis* in Tucuman in the Dry Season.**—*Rev. Inst. Bacteriológ.* Buenos Aires. 1927. Mar. Vol. 4. No. 7. pp. 662-677. With 5 text figs. [2 refs.] English summary pp. 677-678.

Anopheles pseudopunctipennis, the chief carrier of malaria in Argentina, continues to breed throughout the year; during the dry season its numbers are diminished, the breeding-places being restricted to broken ground of perennial springs and mountain streams; during the cold season the growth of the larva is retarded.

A. A.

EVANS (A. M.). **The Discovery of a Specimen of *Anopheles funestus* collected in Mauritius in the Year 1907 or 1908.**—*Ann. Trop. Med. & Parasit.* 1927. Dec. 31. Vol. 21. No. 4. pp. 425-426. [4 refs.]

At the Liverpool School of Tropical Medicine a specimen of *Anopheles funestus* has lately been found in a collection of Mauritius mosquitoes that is labelled with the name of Ross and the date 1908. [This species was observed by MACGREGOR to be abundant in Mauritius in 1922-23: its existence there is another link in the theory of a "Lemuria" connexion between Africa and India.]

A. A.

IATZENKO (Th. I.). Sur la zoophilie de l'*Anopheles maculipennis* en Ukraine. [**The Zoophily in Ukraine of *A. maculipennis*.**—*Bull. Soc. Path. Exot.* 1928. Apr. 18. Vol. 21. No. 4. pp. 322-323. [Ukraine Inst. for Study of Protozoal Diseases.]

In many places in Ukraine *Anopheles maculipennis* shows a preference for cattle, undoubtedly to the benefit of human beings, but without any observed modification of its maxillary denticles; nor has any correspondence between the number of these denticles and the size of the mosquito been observed. The utility of cattle as a defence against anopheles is discounted in the following circumstances.—The contiguity of anopheles and man in rural occupations, and the existence of residences and stables under a common roof; damp and dark houses, ponds near houses, and bright lights at night; absence or scarcity of cattle near breeding-grounds of anopheles; cold and draughty stables and cattle-sheds; insufficient numbers of cattle. The utility of cattle is enhanced by numbers, by stalling in warm sheds, by good housing of the human population, and by care against bright lights and open windows.

A. A.

CURRY (D. P.). **A New Anopheline Mosquito, *Anopheles* (*Chagasia*) *bathanus* Dyar, discovered in the Canal Zone.**—*Amer. Jl. Trop. Med.* 1928. May. Vol. 8. No. 3. pp. 243-248. [3 refs.]

This new species differs from both of its nearest congeners *Anopheles* (*Chagasia*) *farjardoi* and *bonneae* in the leg markings, which are thus described: "legs black, speckled with white; femora and tibiae with

white tips; tibiae densely spotted with many small spots; fore and mid tarsi rather coarsely but numerously spotted; first hind tarsal with 5 narrow white rings, the subapical one the broadest; second to fifth white with the apical fourth black and a small black ring close to the base of each, indistinct on the fifth joint." The larva, which is "essentially as in *bonneae*," lives among the tall grasses and sedges of quick-flowing waters, rides high at the surface with the dorsal half of head and thorax and abdomen completely out of water, and, like its above-named congeners, has something of the attitudes and shore-keeping propensities of the *Dixa* larva. This new species is not one of that unsatisfactory kind which is based on a single mutilated female specimen, but has been seen in such numbers that "the taking and the rearing of specimens in abundance are an easy task."

A. A.

SENEVET (G.) & PRUNNELLE (M.). A propos de la larve de *Anopheles algeriensis* Theobald 1903. [*Larva of A. algeriensis*.]—*Arch. Inst. Pasteur d'Algérie*. 1927. Dec. Vol. 5. No. 4. pp. 534-537. With 1 text fig [2 refs.]

The diagnostic characters of the larva of *Anopheles algeriensis* are set forth in the following table:—

1.	{	Frontal hairs simple	...	...	...	...	<i>A. plumbeus</i>	2
		Frontal hairs branched	...	...	...	...	...	3
2.	{	Posterior clypeal hairs branched	...	...	...	...	...	4
		Posterior clypeal hairs simple	...	...	...	...	...	4
3.	{	Antero-internal clypeal hairs simple	...	...	...	...	<i>A. bifurcatus</i>	
		Antero-internal clypeal hairs branched	...	...	...	...	<i>A. clutus</i>	
4.	{	Antero-internal clypeal hairs with lateral branches	...	...	...	...	<i>A. algeriensis</i>	
		Antero-internal clypeal hairs simple	...	...	...	...	<i>A. marteri</i>	
							A. A.	

SENEVET (G.) & PRUNNELLE (M.). Une nouvelle espèce d'anophèle en Algérie, *Anopheles marteri* n.sp. [*New Species of Anopheles from Algeria*.]—*Arch. Inst. Pasteur d'Algérie*. 1927. Dec. Vol. 5. No. 4. pp. 529-533. With 4 text figs [Pasteur Inst., Algiers.]

A new species, *Anopheles marteri*, is here described as approximate to *A. bifurcatus*, but differing from it and from all other Algerian species in the characters of the male genitalia; the larva also differs in having the posterior clypeal hairs and the antero-internal clypeal hair simple.

A. A.

RAFFAELE (Giulio). Una nuova specie di "Anopheles." (*A New Anopheline Species*.)—*Riv. di Malariaologia*. 1928. Jan.-Feb. Vol. 7. No. 1. pp. 11-17. With 6 text figs. [English summary p. 81.] [Experim. Station, Antimalaria Campaign, Rome.]

This new species from Calabria, *Anopheles italicus*, is akin to *superpictus*, *sergenti*, and *hispaniola*, and like *superpictus* breeds in mountain streams. It has distinctive adult and larval characters and its egg is devoid of floats.

A. A.

COVELL (G.). *A Note on the Local Variations and Distribution of Anopheles philippinensis* Ludlow.—*Indian Jl. Med. Res.* 1928. Apr. Vol. 15. No. 4. pp. 1063-1065. With 1 plate & 1 text fig. [3 refs.] [Central Malaria Bureau, Kasauli.]

The author has examined a considerable collection of *Anopheles philippinensis* individually representing its whole range from the Philippines

westwards to Coorg (in the west of Southern India). Considerable individual variation occurs in the course of the range of the species, but they all merge into one another. [The range of *A. philippinensis* is by no means singular; see this *Bulletin*, Vol. 22, p. 287.)

A. A.

EDWARDS (F. W.). **Mosquito Notes.—VII.**—*Bull. Entom. Res.* 1928. Feb. Vol. 18. Pt. 3. pp. 267–284. With 4 text figs.

Among the items in these notes are diagnoses of four varieties of *Anopheles mauritianus* said to “show a distinct tendency to localization,” and a diagnosis of *A. symesi* distinguished as a new species close to *A. mauritianus*.

A. A.

SYMES (C. B.). **Key to the Identification of Common Anophelines of Kenya.**—*Kenya & East African Med. Jl.* 1927. Dec. Vol. 4. No. 9. pp. 281–286. With 12 figs. on plates.

Keys for identification both of adults and of larvae— the latter being particularly well illustrated.

A. A.

DAVIS (Nelson C.). **Notes on the Development of Ovarian Follicles in Argentine Anopheles.**—*Amer. Jl. Hyg.* 1928. May. Vol. 8. No. 3. pp. 467–475. [1 ref.]

According to these observations *Anopheles pseudopunctipennis* does not, as a rule, ripen its eggs after a single feed of blood, although the species of the Nyssorhynchus group may do so under the specially stimulating influence of warm weather. In *Anopheles* fed only on fruit the ova do not develop beyond stage 2 (of Christophers). The largest eggs of *A. pseudopunctipennis* are barely 6 mm., those of the Nyssorhynchus group are considerably less; in general the length of eggs increases from 15 to 20 per cent. after extrusion.

A. A.

DAVIS (Nelson C.) & SHANNON (Raymond C.). **The Habits of *Anopheles rondoni* in the Argentine Republic.**—*Amer. Jl. Hyg.* 1928. May. Vol. 8. No. 3. pp. 448–456. With 2 text figs. [4 refs.]

The breeding-season of *Anopheles rondoni* in Jujuy (N. Argentina) is at its height probably in March. The species, which according to the authors is not a variety of *A. tarsimaculatus*, is found in houses “in appreciable numbers,” but so far has resisted experimental infection with malaria.

A. A.

LA FACE (Lidia). Sulla resistenza delle larve degli anofelini alla salinità. (**On the Resistance of the Larvae of the Italian *Anopheles* to the Salt Content of Waters.**)—*Riv. di Malariaologia.* 1928. Jan.–Feb. Vol. 7. No. 1. pp. 18–30. [16 refs.] [English summary p. 81.] [Experim. Station, Antimalaria Campaign, Rome.]

According to the English summary *Anopheles elutus* in the laboratory is more tolerant of NaCl than *A. maculipennis* and the tolerance of *A. superpictus* is intermediate to the two.

A. A.

SWELLENGREBEL (N. H.) & DE ROOK (H.). Signification du nombre relatif des mâles d' "*Anopheles maculipennis*." (**On the Value of the Male Rate of *Anopheles maculipennis*.**)—*Riv. di Malarologia*. 1928. Jan.-Feb. Vol. 7. No. 1. pp. 7-10. With 3 charts. [1 ref.] [English summary p. 80.] [Inst. of Trop. Hyg., Amsterdam.]

The gist of the authors' observations is that the percentage of male *Anopheles* captured in shelters is no indication of the distance of breeding places unless the captures are made under comparable conditions.

A. A.

MISSIROLI (A.). Alcuni protozoi parassiti dell' "*Anopheles maculipennis*." (**Protozoan Parasites of *Anopheles maculipennis*.**)—*Riv. di Malarologia*. 1928. Jan.-Feb. Vol. 7. No. 1. pp. 1-3. With 6 figs. on 1 plate. [1 ref.] [English summary p. 80.] [Experim. Station, Antimalaria Campaign, Rome.]

Herein are described and figured, as parasites of *Anopheles maculipennis*, a Crithidia from the gut and Malpighian tubules, a Nosema from the midgut, and, what is more remarkable—since, as the author is aware, the Sarcosporidia are generally supposed to be restricted to the higher vertebrates—a Sarcocystis from the thoracic muscles.

A. A.

COVELL (G.). **A Note on Variations of the Hind Tarsal Markings in *Anopheles fuliginosus* Giles and *Anopheles ramsayi* Covell.**—*Indian J. Med. Res.* 1928. Apr. Vol. 15. No. 4. pp. 1059-1062. [12 refs.] [Central Malaria Bureau, Kasauli, India.]

ADIE in 1903 drew attention to the fact that in Ferozpur in the cold weather (November to April) *Anopheles fuliginosus* appeared in a variable guise, its most conspicuous diversion being in the garniture of the hind legs, the three terminal tarsal segments of which might be completely white. The author confirms this seasonal variability of *A. fuliginosus*, from Saharanpur, and also draws attention to a similar variation in *A. ramsayi*.

A. A.

BOREL (M.). Enquête entomologique et épidémiologique à Can-Tho et Bac-Lieu (Cochinchine). (**Entomological and Epidemiological Enquiry in Cochinchina.**)—*Bull. Soc. Path. Exot.* 1927. Dec. 14. Vol. 20. No. 10. pp. 974-976.

In these discursive remarks Can-Tho, an urban centre in western Cochinchina, is contrasted with a neighbouring rural area, Bac-Lieu. In Can-Tho *Anopheles* breeding-places have been reduced to a minimum and only a few larvae (*A. vagus*) were seen. In Bac-Lieu *Anopheles* (*A. vagus*), both larvae and adults, were plentiful, and a few children were observed to have an enlarged spleen.

A. A.

SHANNON (R. C.) & DEL PONTE (E.). Informe de una investigación preliminar sobre los anofeles del río Alto Paraná, en la Argentina. (**An Account of a Preliminary Investigation into the *Anopheles* of the River Alto Paraná, Argentine.**)—*Rev. Inst. Bacteriológ.* Buenos Aires. 1927. Mar. Vol. 4. No. 7. pp. 706-723. With 5 text figs.

The prevalent species of *Anopheles* are *A. albitarsis*, *A. tarsimaculatus* and *A. argyrotarsis*, not the *A. pseudopunctipennis* common in other parts of the Argentine.

H. Harold Scott.

VAN THIEL (P. H.). Maxillenzahzahl und Flügellänge bei *Anopheles maculipennis*. [Number of Maxillary Teeth and Length of Wing in *A. maculipennis*.]—*Acta Leidensia* (*Scholae Med. Tropicae*). 1927. Vol. 2. pp. 198–206. With 2 charts in text. [11 refs.] English summary p. 206.

The substance of this paper is to be found in this *Bulletin*, Vol. 23, p. 712, and Vol. 24, p. 883.

A. A.

CHODUKIN (N. I.). Zur Frage ueber die Atermobiosis bei den Larven einiger turkestanischen Phlebotomi (*Ph. li, papatasi* und *Ph. Caucasicus* s. *Sergenti*). [On the Question of Hibernation by the Larvae of some Turkestan Species of Phlebotomus.]—*Pensée Méd. d'Usbekistane*. Tashkent. 1927. Oct. Vol. 2. No. 1. German summary p. 128. [In Russian pp. 78–82. 3 refs.]

According to the German summary, Chodukin, in Turkestan, in his studies of the hibernation of *Phlebotomus li*, *P. sergenti*, and *P. papatasi*, observed the phenomenon called by ROUBAUD "heterodynamy," quite independently. In general, his observations agree with those of ROUBAUD (*ante*, p. 279).

He found that the "asthenic" stage of the larva of these species might, without any exposure to cold, be much protracted (to 355 days); that the larva could stand exposure to temperature between -7° C. and -10° C. only a short time; that the usual term of larval "asthenobiosis" (started by a critical lowering of temperature to 11° to 12° C.) ranged between 2 weeks and 2 months; that in one and the same generation of larvae there might occur both "asthenic" larvae [i.e., larvae whose growth is indefinitely protracted] and "active" larvae [i.e., larvae that become full-grown in the course of about 3 weeks]; and that the longevity of the hibernating ("asthenic" or torpid) larva depends upon the timely onset of the critical low temperature—if this fall too late only a small percentage of larvae recover.

A. A.

ROUBAUD (E.). Longue durée de l'asthénobiose pseudo-hivernale chez *Phlebotomus papatasi*; action réactivante de l'athermobiose prolongée. [Lengthy Pseudo-Hibernal Asthenobiosis in *P. papatasi*: Resuscitating Action of Prolonged Hibernation.]—*Bull. Soc. Path. Exot.* 1928. Feb. 8. Vol. 21. No. 2. pp. 107–108. [1 ref.]

Referring to the state of suspended development that may supervene in the 4th larval stage of *Phlebotomus papatasi*, the author relates an experiment showing that this torpid interval may last for a year. A batch of eggs of this species laid on February 18th, and kept at a temperature of 28° C. gave issue to larvae which, having reached their 4th stage, became torpid and on April 6th were placed in sand and earth in a saturated atmosphere, in a laboratory where the temperature ranged between 14° C. and 22° C. There they were left. One larva (the first) resumed development in November, another in December, others during January, and the last in February.

A. A.

ROUBAUD (E.). L'influence maternelle dans le déterminisme de l'asthénobiose acyclique ; métagonie et réactivants métagoniques. [**Maternal Influence as affecting Delayed Development and Resumption of Development.**].—*C.R. Acad. Sci.* 1928. Apr. 30. Vol. 186. No. 18. pp. 1236-1238.

In batches of eggs of *Stegomyia fasciata* also, according to the author, some of the eggs may contain larvae that exist in a similar state of "asthenobiosis." In the present paper the author surmises that this checked development or "asthenobiosis" is due to an unduly prolonged retention of the individual egg in the ovary ; that eggs that give issue to "active larvae" (i.e., larvae that develop continuously and quickly) are eggs that have ripened quickly in the ovary, and eggs that give issue to "tardy larvae" (i.e., larvae that become torpid and require a special stimulus for resumption of development) are eggs of which the ripening has been slow.

A. A.

CRAIGHEAD (A. C.) & DAS (Sribas). **Report on a Sandfly Survey of Pusa Estate, Bihar.**—*Indian Jl. Med. Res.* 1928. Apr. Vol. 15. No. 4. pp. 861-872. With 1 plan & 1 chart. [9 refs.] [Kala-Azar Commission.]

The Pusa estate, of 1,400 acres in Bihar, is an experimental station, and the headquarters of the Indian Agriculture Department. A staff of 800, Europeans and Indians, is well housed on the estate, of which the sanitation is considered good ; and there is a tidal population of 500 Indian labourers and domestic servants coming in daily from surrounding villages ignorant of the arts of sanitation. Kala azar appears to have been first recorded in 1913 (1 case), to have continued nearly stationary until 1920, and to have greatly increased year by year since 1921 ; but whether the increase is real or is due to different standards of diagnosis is, like the character of the company kept by the good wife of Bath in youth, a question to be left unspoken. A house-to-house search, made and repeated between June 18th and August 1st, and including 180 quarters and buildings on the estate and the bazar and five villages in the environs, disclosed *Phlebotomus papatasi*, *P. minus* and its variety *niger*, *P. argentipes*, and *P. squamipleuris*—the first three species common everywhere, the last species not so common. Dissections continued from June 20th to August 1st, and including 119 specimens of *argentipes*, brought to light one specimen of this species infected with *Leishmania*.

A. A.

PATTON (W. S.) & HINDLE (Edward). **The North Chinese Species of the Genus *Phlebotomus* (Diptera, Psychodidae).**—*Proc. Roy. Soc. Ser. B.* 1928. Apr. Vol. 102. No. B720. pp. 533-551. With 11 text figs. [7 refs.]

The three novel species from N. China here re-considered were first described in 1926 (see this *Bulletin*, Vol. 24, p. 428) as *P. major chinensis*, *P. sergenti* var. and *P. perturbans* var. Their authors now

give some particulars of their ontogeny and bionomy, and at the same time recharacterize the *perturbans* variety as a new species by name *P. taianensis*.

The eggs and the first and fourth larval stages of each species are severally described and beautifully figured, as also are the spermathecae of *P. major chinensis* and *P. sergenti* var., and the buccal cavity (in comparison with that of *P. perturbans*) and the male terminalia of *P. taianensis*.

All three species appear about the end of May, but whereas *P. major chinensis* is prevalent only during the early part of summer, *P. sergenti* continues abundant in August and may be seen occasionally throughout September, while *P. taianensis* lasts to the middle of September.

P. major chinensis, as observed in the laboratory at room temperature (25° to 30° C.), lays about fifty eggs in one batch. The eggs, which have to be kept moist, generally hatch after 10 or 11 days, the four larval stages occupy altogether 25 to 30 days, and the pupa stage occupies 7 to 10 days, so that the whole life-cycle may be completed in six or seven weeks. All larvae, however (usually 4th stage larvae), that had not pupated by the middle of August passed the winter as larvae and did not pupate until the following February or later. Some of these larvae were found to be able to endure a spell of freezing in the ice-chest. Thus, from eggs of the same batch, and kept under apparently identical conditions, some completed their development in 6 or 7 weeks, while some took nine months. The authors therefore are convinced that in a state of nature this species can only rarely complete its life cycle in one season. The adults are active. The female seems generally to take only one feed of blood and to digest it slowly (in 6 or 7 days) immediately after which she lays her eggs and then dies.

P. sergenti, the commonest of the three species, is easy to keep. The female will feed 3, 4, or even 5 times before laying her eggs, digestion usually being complete on the third day after a full meal. In the laboratory the life-cycle is completed in 7 to 8 weeks. The first stage larva is particularly sluggish. There are two broods in a year. Males of this species were observed paired with females of *P. major chinensis* on five occasions.

P. taianensis seems to have the widest distribution, but is local. Its normal hosts seem to be frogs, toads, lizards, and snakes. It feeds voraciously and digests very quickly, so that it may be got to feed every day or two. The larva is active and hardy, and is able to stand desiccation for a considerable time. The life-cycle is similar to that of the other species, and there seem to be at least two broods in a year.

A. A.

MAGNITSKY (V.) & GUTZEVITCH (A.). **On the Question of the Variation of Some Characters of the Species of the Genus *Phlebotomus*.**—*Rev. Microbiol. et Epidémiol.* 1928. Jan. Vol. 7. No. 1. English summary pp. 137–138. [In Russian pp. 35–45.]

The authors notice the variability of the accepted specific characters of wing, antenna, and maxillary palp in *Phlebotomus*, particularly in the males of *P. papatasi* and *perniciosus*. They therefore hail the employment

for taxonomic purposes of characteristic features of the palate and the spermatheca of the female [apparently assuming that these structures do not vary].

A. A.

PERFILIEV (P. P.). Sur l'anatomie des phlébotomes. [**Anatomy of Phlebotomus.**]—*Bull. Soc. Path. Exot.* 1928. Feb. 8 & Mar. 14. Vol. 21. Nos. 2 & 3. pp. 159-171; 254-257. With 20 figs. [14 refs.] [Military Acad. of Med., Leningrad.]

According to the author the novel items brought out in these observations on the anatomy of Phlebotomus are the difference between the salivary glands in the male and female, the presence of a salivary pump in the male, and differences having a taxonomic significance in some structural details of the genital apparatus.

A. A.

PERFILJEV (P.). Beiträge zur Anatomie der Phlebotomus-Larven. [**Anatomy of Phlebotomus Larvae.**]—*Cent. f. Bakt.* 1. Abt. Orig. 1928. May 14. Vol. 107. No. 4-5. pp. 296-305. With 11 text figs. [8 refs.] [Military Med. Acad., Leningrad.]

A description of anatomical and microtomical detail of the first-stage larva of Phlebotomus—not suitable for summary.

A. A.

SINTON (J. A.). Notes on Some Indian Species of the Genus *Phlebotomus* Part XXII. The Female of *P. newsteadi* Sinton 1926.—*Indian Jl. Med. Res.* 1928. Jan. Vol. 15. No. 3. pp. 589-593. With 9 figs. on 1 plate. [3 refs.] [Central Malaria Bureau, Kasauli.]

The species *Phlebotomus newsteadi* was described by this author (*Ind. Journ. Med. Res.*, 1926, Vol. 13) from a male. In the collection containing the male type of the species there have now been found four females which form the basis of the present paper. The main features of the species are the relatively large size, the erect hairs on the abdominal terga, the very long legs, and (in cleared and mounted specimens) the characteristic moniliform spermatheca. The locality given is Kasauli, Punjab, 6,000 ft.

A. A.

PARROT (L.). Sur quelques phlébotomes de la Bokhara. [**Some Phlebotomi from Bokhara.**]—*Rev. Microbiol. et Epidémiol.* 1928. Vol. 7. No. 2. French summary pp. 230-234. [In Russian pp. 183-189. With 5 text figs. 4 refs.] [Pasteur Inst., Algiers.]

Parrot describes from Bokhara *P. minutus* var. *sogdianus* and *P. major* var. *longiductus*, both of which he considers to be new varieties. He also redescribes *P. sergenti* (with which he maintains *P. caucasicus* of Marzinowsky to be synonymous), and *P. lu* of Popow (which he considers to be a variety of *P. sergenti*).

A. A.

POPOW (Peter). Bemerkungen zu: L. Parrot, A. propos de *Phlebotomus caucasicus* et de *Phlebotomus sergenti* diese Zeitschrift, 1926, Bd. 30, S. 719 [**Concerning *P. caucasicus* and *P. sergenti*.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1928. Mar. Vol. 32. No. 3. pp. 148-149.

The author maintains that *Phlebotomus caucasicus* of Marzinowsky is a species distinct from *P. sergenti* of Parrot.

A. A.

JOBLING (B.). The Structure of the Head and Mouth Parts in *Culicoides pulicaris*, L. (Diptera Nematocera).—*Bull. Entom. Res.* 1928. Feb. Vol. 18. Pt. 3. pp. 211–236. With 10 text figs. & 4 plates. [21 refs.] [Wellcome Bureau of Scient. Research, London.]

A minute, critical, and finely illustrated anatomical study. Unlike other Orthorrhaphous blood-sucking flies, the male is provided with mandibles, though they are weak. The severely irritating bite of *Culicoides* is said to be relieved at once by rubbing with a moistened crystal of sodium carbonate.

A. A.

SHANNON (R. C.) & DEL PONTE (E.). Cuatro notas sobre especies nuevas de Dipteros Nematóceros, Hematófagos o no, de la República Argentina. [Four Notes on New Species of Diptera found in the Argentine].—*Rev. Inst. Bacteriológ.* Buenos Aires. 1927. Mar. Vol. 4 No. 7. pp. 724–736. With 2 figs. [7 refs.]

In the *Rev. del Instituto Bacteriológico*, 1925, Vol. 3, PETROCCHI in a list of the mosquitoes in the Institute collection, included eleven new species without descriptions; in the first of these notes five of them are now described.

In the second note is a description of a new species of *Phlebotomus*, *P. sordelii*, together with a key to the Argentine species and a bibliography referring to the genus. The third note describes in detail *Bruchomyia pallipes* (Psychodidae), and the fourth a new species of *Leptoconops*, *L. petrocchiae*.

H. Harold Scott.

WOLLMAN (E.). Le rôle des mouches dans le transport de quelques germes importants pour la pathologie tunisienne. [The Rôle of Flies in the Carriage of Pathogenic Germs in Tunis].—*Arch. Inst. Pasteur de Tunis.* 1927. Dec. Vol. 16. No. 4. pp. 347–364. With 4 text figs. [5 refs.]

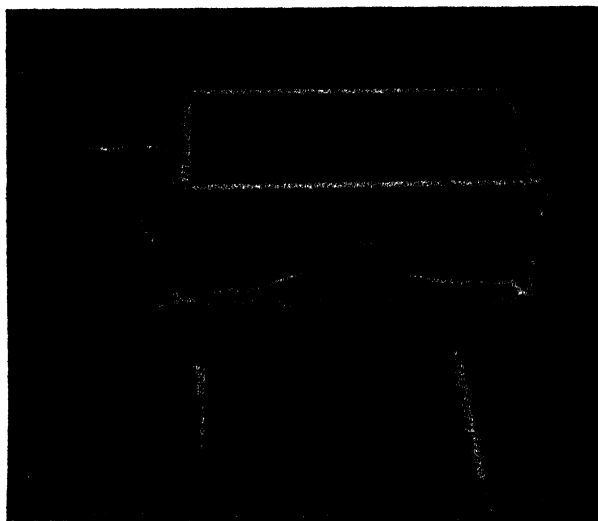
The author begins with some remarks on the antiquity of the observation of the concurrence of morbidity and abundance of flies, and upon the difficulties of acquiring any exact knowledge of this matter through experiment with "wild" flies; he also describes his method of rearing *ab ovo* aseptic flies intended for experimentation. The experiments recorded in this paper give proof that the domestic fly reared aseptically and then exposed for a time to infection, severally, with the bacillus of Weeks (acute conjunctivitis), of Morax-Axenfeld (subacute conjunctivitis), of contagious abortion, and of plague, can remain potentially infective for a certain time afterwards. In the case of Weeks' bacillus the aseptically-reared experimentally-infected flies did not become clean again until 6½ to 17 hours after infection; in the case of Morax-Axenfeld's bacillus not till 3½ hours after; in the case of *Brucella abortus* not till 48 hours after; and in the case of the plague bacillus not till some time within 24 hours after. The author contrasts the rapidity with which flies freed themselves from the above-specified infections with the long time (12 days) that flies experimentally infected with typhoid and dysentery bacilli retain those infections.

The author thinks that the fly's habit of constantly brushing itself with its tarsal brushes is what frees it from bacteria adhering to the body.

A. A.

BEVAN (Ll. E. W.). **A New Method of Feeding Blood-Sucking Flies.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1927. Nov. 25. Vol. 21. No. 3. pp. 219-220. With 2 text figs.

Two boxes are used in this method of feeding blood-sucking flies. One box is large enough to hold a rabbit; the other, smaller, box has (besides the usual guarded opening for introducing and manipulating flies) a glass top and a muslin bottom. Through holes in its sides two



Feeding-box for blood-sucking flies shown in position.

[Reproduced from the *Transactions of Tropical Medicine and Hygiene*.]

wooden rods run across the cavity of the rabbit-box at such a height as to hold down the rabbit with its back projecting between them (the back, of course, being suitably shaved). The wooden rods also support the fly-box, with the back of the rabbit bulging into its muslin floor. The rabbit usually stays quiet and the whole contraption can be left, the flies feeding when they feel inclined.

A. A.

BEATTIE (Mary V. F.). **Observations on the Thermal Death Points of the Blow-Fly at Different Relative Humidities.**—*Bull. Entom. Res.* 1928. May. Vol. 18. Pt. 4. pp. 397-403. With 2 text figs. [5 refs.]

Under the laboratory conditions imposed, a relative humidity of 70 per cent. appeared to be the optimum for blowflies exposed to high temperatures; saturated air and dry air were fatal at lower temperatures than air of 60-80 per cent. humidity.

A. A.

PARMAN (D. C.), BISHOPP (F. C.), LAAKE (E. W.), COOK (F. C.) & ROARK (R. C.). **Chemotropic Tests with the Screw-Worm Fly.**—U.S. Dept. Agric., Wash., D.C., Dept. Bull. 1472. 1927. Mar. 32 pp. [5 refs.]

The object of this very elaborate piece of work was to find out some substance, suitable for application to wounds (of domestic animals), to prevent reinfestation by screwworm maggots (*Cochliomyia macellaria*) for at least 48 hours—aside from any necessary larvicidal action. Tests of over 350 repellent substances were made, a measured quantity of each substance being spread upon a standard meat bait exposed in a place where flies were numerous. The repellent value of a substance was decided by the ratio of number of flies visiting the treated bait to number visiting untreated bait. "Of all the materials tested as repellents against the screw-worm fly, certain products obtained from the pine are among the best. These include pine oil, both the destructively and steam distilled, crude turpentine, pine-tar, and pine-tar oil." In consideration of its cheapness, prevalence, innocence, and adhesiveness, the authors consider pine-tar oil the best of all the materials tested by them for protection of wounds of domestic animals against assault by the screw-worm fly. A number of essential oils are good repellents, as also are the insecticides pyrethrum and derris.

A. A.

MERCIER (L.). Présence de la mouche du ver chevelu des laines australiennes (*Chrysomyia albiceps* Wied.) sur la côte du Calvados. Une hypothèse de travail en vue de sa destruction. [*Chrysomyia albiceps* found on the Coast of Calvados.]—*Ann. Parasit. Humaine et Comparée*. 1928. Apr. 1. Vol. 6. No. 2. pp. 200–202. [7 refs.]

The author remarks the wide distribution of *Chrysomyia albiceps* in the warm regions of the Old World and the habits of its larvae (known as "hairy maggots"), about which much has been written. He proposes to control the species by means of the small Staphylinid beetles of the genus *Aleochara*, several species of which are known parasites of dipterous puparia and are easily obtained.

A. A.

MOUTIER (François). Parasitisme occasionnel d'un diptère *Crataerhina pallida* Latreille sur l'homme. [**Occasional Parasitism of *Crataerhina* sp. on Man.**]—*Ann. Parasit. Humaine et Comparée*. 1928. Jan. 1. Vol. 6. No. 1. pp. 105–106. With 1 text fig. [3 refs.]

Note of the occurrence of *Crataerhina pallida*, a Hippoboscid fly parasitic on the house-swallow and martin, attached to the head of a young woman who slept in an attic. The flies were traced to some swallow's nests that had fallen down the chimney.

A. A.

NITZULESCU (Virgil). Contributions à l'étude de l'appareil buccal et de la pompe salivaire chez les insectes. [**Mouth Apparatus and Salivary Pump in Insects.**]—*Bull. Soc. Path. Exot.* 1927. Dec. 14. Vol. 20. No. 10. pp. 980–986. With 6 text figs. [4 refs.] [Parasit. Lab., Faculty of Med., Paris.]

Attention is drawn to the bilateral asymmetry of the serrations of the hypopharynx of *Phlebotomus*. The salivary glands of *Simulium*

are described and figured. The statement that the floor of the suctorial tube of the females of the orthorrhaphous Diptera is formed not by the hypopharynx but by the mandibles is emphasized. The suggestion emitted by CORNWALL that the efferent salivary duct of Rhynchota may communicate with the pharynx is strictly contradicted.

A. A.

NITZULESCU (Virgil). Contribution à l'étude de la pompe salivaire des Tabanidés. [**The Salivary Pump of Tabanidae.**]—*Bull. Soc. Path. Exot.* 1927. Nov. 9. Vol. 20. No. 9. pp. 846-851. With 4 text figs. [Parasit. Lab., Faculty of Med., Paris.]

The salivary pump in Tabanidae is here described in detail and is characterized as being in a general way similar to that of Simuliidae, but more posterior to and dissociated from the hypopharynx.

A. A.

KRÖBER (O.). Die amerikanischen Arten der Tabaniden-Subfamilie *Diachlorinae* End. [**The American Species of Tabanidae.**]—*Briefte z. Arch. f. Schiffs- u. Trop.-Hyg.* 1928. Vol. 32. No. 2. 55 pp. With 26 text figs.

This appears to be a useful piece of work. It contains tables for identification of genera and species, as well as descriptions of individual species and figures of diagnostic features.

A. A.

HARRIS (R. H. T. P.). **Tsetse Fly Investigations in Zululand.**—*Union of S. Africa. Science Bull.* No. 62. 1927. Sept. 26. 19 pp. [3d.]

This is a synopsis of a Report to the Union Government of S. Africa—a report on the bionomy of tsetse-flies in Zululand where *Glossina pallidipes* is said to be "by far the commonest" species. It is to this species that the observations reported relate.

In the laboratory the span of adult life was usually about 100 days, although in one case a petted individual lived 163 days. No female produced more than nine offspring. Although the insect feeds entirely on blood, the author frequently observed it sampling the trunk of a tree with its proboscis. The author thinks that warmth stimulates it to feed.

In the field *G. pallidipes* is an inveterate wanderer and persistent hunter, frequently found in places where there is no evidence of game, and always pursuing its prey by sight. In a bad light or on a cloudy day a suitable host may be overlooked. The author refers at length to his experiments (see this *Bulletin*, Vol. 21, p. 435) showing that a conspicuous dummy, of roughest journeyman make, attracts more tsetses than a naturally inconspicuous zebra. According to the author's experience, where animals are massed together they are likely to be overlooked by this restless wandering *pallidipes* guided entirely by sight, so that there is a continual passing away of these flies from the denser game reserves to areas where animals are scarce. The author, therefore, who believes that the only effective method of controlling the fly is by reducing the game upon which it feeds, is careful to point out that this reduction must "be effected cautiously

under close and highly skilful supervision, and according to a most carefully thought-out plan of operations, or there may be dire and discouraging results."

A. A.

FRANTZEN (Wilhelm). Die geographische Verbreitung und wirtschaftsgeographische Bedeutung der Tsetse-Fliege. [**Distribution and Economic Significance of Tsetse Flies.**]—*Materiaux pour l'Etude des Calamités*. 1928. Jan.-Mar. Vol. 4. No. 16. pp. 293-338. With 1 folding map. [156 refs.]

This is not a very striking compilation. It deals with *Glossina palpalis* and *morsitans*, describing for each species its geographical distribution, its retardative influence on human progress, and something of the attempts at its control. In the case of *palpalis* its pathological significance in the dissemination of human trypanosomiasis is described at some length, and in the case of *morsitans* its economic importance in the spread of nagana among domestic animals.

A. A.

CARRIÓN (Arturo L.). **Preliminary Report on a Rat and Flea Survey of the City of San Juan, Porto Rico.**—*Porto Rico Rev. of Pub. Health & Trop. Med.* 1927. Oct. Vol. 3. No. 4. pp. 131-145. With 7 charts.

In this first survey 360 live rats were killed and examined—287 *decumanus*, 41 *rattus*, and 32 *alexandrinus*. Fleas were found in 53.6 per cent. of them, the total collection of fleas amounting to 2,575. All but 36 of the fleas were identified as *Xenopsylla cheopis*—the 36 exceptions being *Echidnophaga gallinacea* (35) and *Ctenocephalus* (1). The percentage of rats individually infested with fleas ranged between 100 in July and 30.4 in March. The average number of fleas per rat ranged between 14.41, in May, and 4 in August; the index for the year (stated as "cheopis index") was 7.05.

A. A.

PINTO (Cesar), BARRETO (João de Barros) & FIALHO (Amadeu). Sobre a frequencia das especies de pulgas de ratos, verificadas no Rio de Janeiro. [**Frequency of Species of Rat Fleas at Rio de Janeiro.**]—*Sciencia Med.* 1928. Mar. Vol. 6. No. 3. pp. 110-116. English summary p. 116.

From the middle of July to the middle of December 700 fleas, of which 75 per cent. were from *Mus norvegicus* and 18 per cent. from *Mus rattus*, were identified by the rat-catching service of Rio de Janeiro. Of the fleas 56.28 per cent. were *Xenopsylla cheopis* (26.85 male and 29.43 female); 42.28 per cent. were *X. brasiliensis* (23.0 male and 19.28 female); and the remaining 1.44 per cent. consisted of female specimens of *Leptopsylla musculi*, *Synosternus pallidus*, *Ceratophyllus fasciatus*, *Ctenocephalus felis*, and a male *Pulex irritans*. The average number of fleas per rat for the whole term was 2.4 with a maximum of 6 in September and a minimum of 1.2 in July. *X. brasiliensis* was the most prevalent species in July, August, and October, and *X. cheopis* during the other 3 months.

A. A.

ROUBAUD (E.). Foyer de développement de *Xenopsylla cheopis* à Paris. Observations sur la biologie de cette puce. [**Focus of Development of *X. cheopis* in Paris: its Biology.**].—*Bull. Soc. Path. Exot.* 1928. Mar. 14. Vol. 21. No. 3. pp. 227-230. [4 refs.]

After noticing the numerous occurrences of *Xenopsylla cheopis* recorded in England and France, the author goes on to tell of a hot-bed ("un vaste foyer") of this species recently discovered by him in basements and cellars of an establishment in Paris where an installation for central heating kept the underground temperature at 23° to 25° C. The insects were so numerous that in a few days he caught more than 100 in traps. A trap that he finds particularly attractive is a tin cylinder containing the dead body of a mouse packed in buckwheat. The author is able to affirm that this hot-bed is an ancient and permanent focus of development of *Xenopsylla cheopis*.

A. A.

GARNHAM (P. C. C.). **Fleas in Hides and Cotton-Seed.**—*Kenya & East African Med. Jl.* 1927. Dec. Vol. 4. No. 9. pp. 287-290. [1 ref.]

In the course of a year the author examined many bundles of hides and 1,434 bags of cotton-seed being collected for forwarding at Kisumu on the Kavirondo Gulf of Victoria Nyanza, in almost every case making his examinations as the stuff was unloading; and he found that even when rats were absent, unattached fleas were present in considerable number—except among hides that had been packed with naphthol. The species identified were chiefly *Xenopsylla cheopis* and *X. brasiliensis*, the former predominating. As he points out, this is an important observation, since hides and cotton-seed are notoriously dangerous produce in connexion with plague.

A. A.

FIELDING (J. W.). **Observations on Rodents and their Parasites.**—*Jl. & Proc. Roy. Soc. New South Wales.* 1927. Vol. 61. pp. 115-134. [30 refs.]

In 13 months, ending September, 1926, fleas to the number of 536 were obtained from 222 living rats at the Townsville (Australia) Institute of Tropical Medicine; 493 were *Xenopsylla cheopis*, 33 *Ctenocephalus felis*, 8 *Ctenocephalus canis*, 1 *Pulex irritans*, and 1 *Ctenopsylla musculi*.

The following endoparasites were obtained from these and other local rats:—

Coccidia sp. in 10.4 per cent. of 222 rats examined.

Trypanosoma lewisi in 14.0 per cent. of 222 living rats and in 3.2 per cent. of 1,557 dead rats.

Rat leprosy in 0.22 per cent. of 1,779 rats examined.

Hormorhynchus momiformis in 16.4 per cent. of 222 rats.

Hepaticola hepatica in 6.41 per cent. of 1,779 rats.

Ganguleteracis spumosa in 6.3 per cent. of 222 rats.

Syphacia obvelata in 0.9 per cent. of 222 rats.

Gongylonema sp. in 3.6 per cent. of 222 rats.

Trichuris muris in 11.3 per cent. of 222 rats.

Hymenolepis diminuta in 15.3 per cent. of 222 rats.

Cysticercus fasciolaris in 1.0 per cent. of 1,779 rats.

Doubtful species observed in *Mus norvegicus*, each on one occasion, were *Heligmosoma brasiliense* and *Strongyloides* sp.

Neither the plague bacillus (1,779 rats) nor Spirochaetes (222 rats) were found.

A. A.

HENDERSON (J. R.). **A Note on Some External Characters of Larvae of *Xenopsylla cheopis*.**—*Parasitology*. 1928. Apr. Vol. 20. No. 1. pp. 115–118. With 4 text figs. [1 ref.] [Dept. of Zoology, Univ. of Edinburgh.]

This note reports the confirmation of the observations of BACOT and RIDWOOD on the larvae of fleas (recorded in *Parasitology*, 1914, Vol. 7, pp. 157–175), and adds some particulars of the structure of the antenna, the distribution of the hairs on the thoracic and abdominal segments, and the features and adjuncts of the tenth abdominal segment.

A. A.

INGRAM (A.). **Three New South African *Xenopsylla* (Siphonapt.).**—*Bull. Entom. Res.* 1928. May. Vol. 18. Pt. 4. pp. 371–375. With 7 text figs.

Diagnostic features of *Xenopsylla piri* from nests of Karoo rat and Transvaal gerbille, and *X. hirsuta* and *sulcata* from nests of Cape gerbilles.

A. A.

CHACIN ITRIAGO (L. G.) & BELLO (Carlos J.). **Clasificación de las ratas de Caracas.** [**Classification of Rats in Caracas.**]—*Gac. Med. de Caracas*. 1927. Nov. 15. Vol. 34. No. 21. pp. 325–327.

Of 2,066 rats caught in Caracas during March–June, 1,980 were *R. norvegicus* and 86 *R. rattus*.

H. Harold Scott.

CHACIN ITRIAGO (L. G.). **Clasificación de las pulgas que contienen las ratas de Caracas.** [**Classification of the Rat-Fleas in Caracas.**]—*Gac. Med. de Caracas*. 1927. Nov. 15. Vol. 34. No. 21. pp. 327–328. [1 ref.]

Of 1,244 fleas from 1,660 rats caught in Caracas, 1,172 were *Xenopsylla cheopis*; 48 were *X. brasiliensis*; 19 were *Ctenocephalus felis*, and 5 were *Leptopsylla musculi*.

H. Harold Scott.

ROUBAUD (E.) & WEISS (A.). **Note sur un hémiptère réduvide chasseur de moustiques et de phlébotomes dans la Tunisie du nord.** [**A Reduviid Bug preying on Mosquitoes and Phlebotomus in N. Tunis.**]—*Arch. Inst. Pasteur de Tunis*. 1927. Apr. Vol. 16. No. 1. pp. 81–83. With 1 text fig.

This ravisher of mosquitoes and Phlebotomus, is *Ploiaria* (*Emesodema*) *domestica*, one of those long-legged and highly predacious Emesid bugs that has raptorial front-legs like a Mantis. It is found in and about houses throughout the Mediterranean region and has attracted the authors' attention in houses in Tunis.

A. A.

ROUBAUD (E.). Adaptation spontanée de la punaise des lits (*Cimex lectularius* Merret) en milieu obscuricole, aux rongeurs domestiques. [**Spontaneous Adaptation of the Bed Bug in the Dark to Household Rodents.**—*Bull. Soc. Path. Exot.* 1928. Mar. 14. Vol. 21. No. 3. pp. 224-226. [3 refs.]

This is a note on a nidus of bedbugs in a Parisian cellar well warmed by an installation for central heating. Hundreds of bugs of all stages, including eggs, were found infesting wooden cages in which white mice were reared in the cellar, the necessary moisture being imparted by dishes of water in which the cages were stood for protection against noxious insects. The bugs were active at all hours of the day, and some of them had wandered from the cages to other parts of the cellar. From the facts that he has seen them thus wandering, and also has received from abroad two young bed-bugs that had been caught on a brown rat, the author concludes—seeing that the cages of white mice were known to be free of this infestation when they were brought to the cellar—that the infestation originated in the cellar and that bed-bugs can adapt themselves to mice and rats and other small deer, and must not be regarded as specific parasites of man.

A. A.

READIO (P. A.). **Studies on the Biology of the Reduviidae of America North of Mexico.**—*Kansas Univ. Sci. Bull.* 1927. Sept. Vol. 17. No. 1. pp. 5-291. With 21 plates. [Numerous refs.] [Dept. of Entomol., Univ. of Kansas, Lawrence, Kansas.]

The Reduviidae are a large family of bugs represented in all regions of the globe, the three tropical and the Australian regions all being much richer in species than the two temperate regions. The family as a whole is predacious, chiefly on other insects; but it includes species that feed on the blood of mammals, and among these are some that have acquired domestic habits and feed on man. Particularly notorious among these last are certain South American species concerned in the transmission of *Trypanosoma cruzi*; others among them are odious because of their painful bites. The present publication deals only with the Reduviidae of temperate North America (Nearctic region); the first 30 pages are devoted to biology and the rest of the work is a systematic account of the species and genera in their several subfamilies, together with bibliography, index, and plates.

A. A.

GLADIN (Sophie). Experimentelle Untersuchung ueber die Wirkung des Käfers *Paederus fuscipes* Curt. (Fam. Staphylinidae) auf das Kaninchenauge. [**Action of *P. fuscipes* on the Rabbit's Eye.**]—*Rev. Microbiol. et Epidémiol.* 1928. Jan. Vol. 7. No. 1. German summary p. 136. [In Russian pp. 18-22. 6 refs.] [Military Med. Academy, Leningrad.]

The little Staphylinid beetles of the widely distributed genus *Paederus* are well known to possess irritant and vesicant qualities. The present paper describes the effects of injecting a suspension of the ground-up beetle into the eye of a rabbit.

A. A.

SAMBON (Louis W.). **The Parasitic Acarians of Animals and the Part they Play in the Causation of the Eruptive Fevers and other Diseases of Man. Preliminary Considerations based upon an Ecological Study of Typhus Fever.**—*Ann. Trop. Med. & Parasit.* 1928. June 12. Vol. 22. No. 1. pp. 67–132. With 19 text figs.

This paper is packed with varied and curious learning and ingenious and suggestive ideas, and is enlivened further by some entertaining personalia. The author takes a biological view of typhus fever, as a species, of very wide geographical range, having many local varieties—such as Rocky Mountain Fever, Japanese River Fever, and the various kinds of typhus or pseudotyphus of Indo-China, Indo-Malaya, and Mexico. He would appear to define the disease as a fever due to a specific Rickettsia having its chief (but not sole) reservoir in small rodents and being transmitted, in the first instance, mainly by the minute acarine parasites of those animals, and particularly by the Trombidiid larvae commonly known as harvest-mites. It is true that in the case of ordinary text-book typhus the disease—as the author claims to have been the first to suggest—is spread among men by the body-louse, but this agency, important though it be, he regards as an “episode” in the larger play of the disease. Such being their importance the author devotes 32 pages to a discursive account of harvest-mites in Europe and America, and harvest-mites in connexion with local forms of typhus in Japan, China, Formosa, Sumatra, Australia, Indo-China, and Mexico. The author takes every opportunity of making an interesting deviation from his course. Thus, from the mention of a Chinese writer of the 16th century, who speaks of a sand-mite that lives in water and by burrowing in the skin of human victims causes a febrile disease, we get on to the Linguatulid larvae occurring subcutaneously in frogs and to the Trombidiid larvae encysted subcutaneously in frogs and other batrachia, and so to endoparasitism of Trombidiid mites.

The eleven pages on mites in other pathogenous aspects include a sketch of the itch-mite in medical history and an enumeration of many well-known acarid parasites of animals by which man also may be attacked. Among these the author mentions the fowl-mites (*Dermanyssus gallinae*) that recently invaded the nurses' quarters at the London Hospital in prodigious numbers and were traced by him to pigeons nesting about the roof. In this connexion the author states that he has suspected for many years that birds and their ectoparasites may be concerned in the natural history of eruptive fevers that affect man and illustrates his argument from an extensive knowledge, both recent and ancient, of the subjects of bird-pox and bird-diphtheria.

The last fifteen pages contain descriptions and figures of new species of Trombidiid larvae.

A. A.

WALCH (E. W.). **Nederlandsch-Indische Trombiculae en verwante Mijten. (Derde mededeeling.) Soorten uit de Lampongsche districten en de omgeving van Makassar. [Trombiculae and Related Mites from Dutch East Indies.]**—*Geneesk. Tijdschr. v. Nederl.-Indië*. 1927. Vol. 67. No. 6. pp. 922–932. With 12 figs. on 3 plates. [7 refs.] English summary pp. 932–933. [Med. Lab., Weltevreden.]

This paper deals with the geographical distribution of Trombidiid larvae in the Netherlands East Indies, with particular reference to

that of *Trombicula deliensis* and *T. schueffneri*, the two species regarded as the chief carriers of tsutsugamushi disease locally. Hitherto these two species have been observed only in Deli on the east coast of Sumatra, where alone tsutsugamushi disease has been diagnosed; but *T. deliensis* is now reported as occurring also in South Sumatra, although no information is obtainable as to the existence there of tsutsugamushi disease. The paper also contains a tabulated statement in minute detail of the specific characters of five local species either new to science or new to the local record.

A. A.

PAWLOWSKY (E. N.) & STEIN (A. K.). Ueber die Wirkung des Stiches von *Ornithodoros papillipes* Bir. auf den Menschen. [Effect upon Man of the Stab of *Ornithodoros papillipes*.]—*Abhandl. a.d. Gebiet d. Auslandskunde. Hamburg. Univ.* 1927. Vol. 26. (D., Med. & Vet. Vol. 2.) [Festschrift NOCHT.] pp. 401-408. With 5 figs. on 2 plates. [22 refs.]

The author gives some particulars of the occurrence of *Ornithodoros tholozani* in Persia, Turkestan, and Bokhara in circumstances supporting the argument that incriminates this species in the transmission of relapsing fever. In one instance, at Huzar in Bokhara, where two soldiers contracted that disease, marks of tickbite were observed, and a similar observation seems to have been made at Tashkent. The bites of *O. tholozani* and *O. "papillipes,"* which are stated to be painless, are described in great detail, as also are their effects upon the skin (as observed in sections) independent of any possible contamination by the secretion of the coxal glands or from the excreta. Briefly, the puncture of the bite shows as a dark purple or cherry-red spot, surrounded by hyperaemia and minute petechiae; this dark central patch becomes a papilla, which persists for some time. The effects on the skin may be described briefly as an acute superficial inflammation with oedematous infiltration of the reticular tissue of the cutis.

A. A.

GARNHAM (P. C. C.). **Susceptibility of *Ornithodoros* to Fire.**—*Kenya Med. Jl.* 1926. Dec. Vol. 3. No. 9. pp. 265-266. [1 ref.]

PEARSON & MOUCHET in their book on the Practical Hygiene of Native Compounds in Tropical Africa assert that firing grass huts is useless as a means of destruction of ornithodoros. The author has found this method of value at Kisumu, where a number of camps have become infested, and no other method has proved as satisfactory. An experiment in which ticks were placed in a series of holes at varying depths in such a hut, and the holes filled with earth, showed that all ticks were killed up to a depth of three inches. It may be advisable to derooft the hut and put the grass inside.

A. G. B.

BOREL (M.). Note sur la présence d'*Argas vespertilionis* (Latreille) 1796 au Cambodge. [Presence of *A. vespertilionis* in Cambodia.]—*Bull. Soc. Path. Exot.* 1928. Apr. 18. Vol. 21. No. 4. p. 328.

In spite of a careful look-out the author, in the course of three years' residence in Cochin China and South Annam, has only once met with an Argasid tick, and that was an *Argas vespertilionis*, at Pnom-Penh.

A. A.

LIMA (Angelo da Costa). Sur le sarcopte producteur de la gale norvégienne. [**The Sarcoptes of Norwegian Itch.**].—*C.R. Soc. Biol.* 1927. Vol. 97. No. 36. pp. 1784-1786.

The author has examined abundant material and now contributes to the interminable discussion as to the zoological status of the parasite of Norwegian itch. He is inclined to agree with those who think it may be a variety of a species of itch-mite proper to some domestic animal—perhaps *Sarcoptes suis* as suggested by FURSTENBERG; but for his own part he has an impression that it may rather be identical with *Sarcoptes canis*.

A. A.

CLEVELAND (L. R.). **Further Observations and Experiments on the Symbiosis between Termites and their Intestinal Protozoa.**—*Biol. Bull.* 1928. Mar. Vol. 54. No. 3. pp. 231-237. [8 refs.] [Dept. of Trop. Med., Harvard Med. School, Boston, Mass.]

Reverting to the subject of depriving termites of their symbiotic intestinal protozoa (see this *Bulletin*, Vol. 22, pp. 835, 836) the author states that this deprivation can be completed in an hour under a pressure of 60 lb. of oxygen—without any immediate ill-effects upon the insects. He now reports that although termites deprived of their protozoa cannot survive indefinitely there are some species in his experiments that lived 107 and even 147 days. Some termites also harbour immense numbers of spirochaetes which are attached to the protozoa—perhaps in some relation of symbiosis. They can be eliminated without damage either to the termites or to the symbiotic protozoa by feeding the termite host on cellulose moistened with 5 per cent. aqueous solution of acid fuchsin.

A. A.

JAFFÉ (R. H.) & WILLIS (D.). **Bartonella Infection in Local Rats.**—*Proc. Soc. Exprim. Biol. & Med.* 1928. Jan. Vol. 25. No. 4. pp. 242-244. With 1 text fig. [4 refs.] [Dept. of Path., College of Med., Univ. of Illinois.]

The authors in Illinois find infection with *Bartonella muris* to be much prevalent among the pedigree rats reared in the laboratory and also to exist to some extent among rats supplied by the local dealer. In the laboratory rats at the age of about 4 weeks the organisms were observed to be numerous in the blood before removal of the spleen. In all the adult laboratory rats examined the organisms appeared in the peripheral blood 4 to 5 days after splenectomy; within 2 days the red cells then dropped from $6\frac{1}{2}$ to $2\frac{1}{2}$ millions, and the haemoglobin content to 35 per cent.; some of the animals died, and some recovered. Recovery starts with a sudden and remarkable shower of normoblasts. Of the local dealer's rats only 1 out of 7 became anaemic, and it recovered within 3 weeks. *Bartonella* is first seen free; later it attaches itself to the surface of the red cell (as many as 30 may adhere to a single red cell); but the authors are not convinced that it enters the red cells.

A. A.

BAYON (H. P.). *Bartonella muris*; its Pathogenic Action in the Progressive Anaemia following Rat Splenectomy and its Resemblance to *B. bacilliformis* of Carrion's Disease.—*Jl. Trop. Med. & Hyg.* 1928. Feb. 1. Vol. 31. No. 3. pp. 29-36. [69 refs.]

These speculations on an interesting subject appear to have been suggested by the author's own observations of the results sometimes following splenectomy, in rats.

The author reviews some significant facts in the history of Oroya fever and of verruga peruana, beginning with the discovery in the red blood cells, in cases of Oroya fever, of the micro-organism eventually named *Bartonella bacilliformis*, and ending with NOGUCHI's recent production of verruga-like lesions containing Bartonella by abrading the skin of monkeys inoculated with a pure culture of the micro-organism from a case of Oroya fever; in some of these monkeys transient anaemia was concurrent, and altogether NOGUCHI's experiments corroborate the views of those who have regarded Oroya fever and verruga peruana as different manifestations, provoked under different circumstances, by one and the same pathogenous agent. The author next refers to MAYER's observation—frequently verified, by others including himself—that rats deprived of their spleen frequently develop a pernicious anaemia (often rapidly fatal) associated with the appearance in the blood cells of micro-organisms (*Bart. muris*) akin to *Bart. bacilliformis*; and to the obvious explanation that a latent chronic infection has here become conspicuously animated and illustrated by removal of the spleen. The author's ingenious hypotheses therefore are (1) that Oroya fever may, like this pernicious anaemia of rats, be a Bartonella infection of the blood determined by some intercurrent detriment—as from malaria or from typhoid—to the spleen; (2) that verruga may, as in NOGUCHI's experiment noticed above, be a Bartonella infection of the skin determined by some intercurrent damage—as from an insect bite—to the skin; and (3) that the native reservoir of this Bartonella "virus" responsible in alternative circumstances for a pernicious febrile anaemia or for a warty eruption of the skin, may be, like that of *Bartonella muris*, a small rodent.

A. A.

CANNON (Paul R.), TALIAFERRO (William H.) & DRAGSTEDT (Lester R.). **Anemia following Splenectomy in White Rats.**—*Proc. Soc. Experim. Biol. & Med.* 1928. Feb. Vol. 25. No. 5. pp. 359-361. [3 refs.] [Depts. of Path., Hygiene & Bact., & Surgery, Univ. of Chicago.]

Attention is directed to the fact that in rats the removal of the spleen is not always followed by anaemia. The authors removed the spleen from some of 13 rats recently obtained from the Wistar Institute, and no significant anaemia followed the operation; but in every one of 11 Chicago rats from which they excised the spleen a marked anaemia followed, usually about the fifth day afterwards. They conclude therefore that the effect of splenectomy depends primarily on the source whence the rat is obtained. It is significant that in 2 of the Wistar rats which had been kept in their animal-room

for several months, as also in 2 Wistar rats inoculated with blood from rats of the infected stock, splenectomy was followed by anaemia. The anaemia in all the authors' cases appeared to be identical with LAUDA's infectious anaemia of rats—typified by a fall in the number of red cells to two millions per cmm., a decrease of haemoglobin to 4–5 gm. per 100 cc. of blood, a rise in leucocytes to as high as 70,000, Bartonella inclusions in the red cells, and marked phagocytosis of the red cells. Etherization or other operations also might lead to this anaemia; but in 8 rats subjected to such operations as laparotomy, removal or injury of testicle, removal of adrenals or of frontal lobes of brain no significant anaemia followed, though in 4 of these rats subjected to splenectomy 11 to 13 days after the disabling operation severe anaemia supervened promptly. The authors emphasize this evidence of the dominant influence of the spleen in the defence against latent infections; at the same time they "feel that the demonstration of Bartonella infections among rats in this country necessitates careful elimination of such infected animals from experiments involving a study of nutrition, and particularly from all experiments in which splenectomized animals are used."

A. A.

LAUDA (E.) & MARCUS (F.). Zur Frage der Ratten-Bartonellen [**Bartonella of Rats.**]*—Cent. f. Bakt. I. Abt. Orig.* 1928. Apr. 18. Vol. 107. No. 1–3. pp. 104–114. [18 refs.]

The authors return to Lauda's study of the sudden and severe haemolytic anaemia that in a large percentage of rats follows the removal of the spleen. (Lauda supposed the ultimate cause of this anaemia to be an invisible virus.) Here they consider the theory of MAYER, BORCHARDT, and KIKUTH (see this *Bulletin*, Vol. 24, p. 831) who suppose that certain dumbbell-shaped inclusions in the red blood cells of such despleened rats—inclusions called *Bartonella muris rattii* by MAYER—are the causative parasites of the anaemia. The authors refer to 61 despleened rats, of which a careful and in most cases a daily blood-examination was made, and in 4 of them no Bartonella inclusions could be found in the course of many weeks. Again they give abstracts of observations of four despleened rats showing that Bartonella may appear and disappear and then re-appear, and that such re-appearances are not always associated with anaemia. They summarize the results of several long series of experiments showing their general failure to observe any sequence of Bartonella inclusions in spleen-intact rats suffering haemolytic anaemia artificially induced by injurious injections. (1) In the first of these series of experiments 16 rats received injections of a rat haemolysin obtained from rabbits: in most of them degenerative changes and great decrease in the red cells occurred, but in not one case were undoubted Bartonella bodies found in the circulating blood; in one instance a single dumbbell-like body was seen, but after death (from severe haemolytic anaemia) no other indubitable bodies were found in this case. (2) Seven rats received subcutaneous injections of toluylendiamin; a great reduction in the number of red cells occurred, but in only one case were Bartonella bodies found. (3) Five rats were treated with pyridin; in only one case were well developed Bartonella bodies observed. (4) Five rats injected with phenylhydrazin; the following day isolated intracellular bodies of suspicious appearance

were visible, but thereafter in only one case were clusters of *Bartonella* found and in isolated red cells. (5) Fifteen rats (14 of which had previously been infected with trypanosomes) were injected with germanin; in only one instance were undoubted forms of *Bartonella* detected. (6) Three rats treated with saponin were all negative.

A. A.

SCHILLING (Viktor) & SAN MARTIN (Antonio). Ueber die Bartonellen-Anämie der Ratten. Die Kultur der Erreger, Immunität und Erkrankung milzhaltiger Ratten. [*Bartonella Anaemia of Rats.*]—*Klin. Woch.* 1928. June 17. Vol. 7. No. 25. pp. 1167-1169. [First Med. Clinic ("Charité" Hosp.), Univ., Berlin.]

The experiments tabulated in this paper are held to confirm the provocative element in *Bartonella muris ratti* infection. The following are the conclusions. Of 13 rats from which the spleen had been removed 11 were found to be infected and 2 not infected; and the 2 negative rats were found to be equally immune when inoculated with *Bartonella* blood. Of 7 rats with spleen intact and all apparently negative 3 remained negative and 1 was doubtfully positive after inoculation with *Bartonella* blood, and 1 remained negative and 2 became doubtfully or certainly positive after inoculation with *Bartonella* culture. Of 6 rats recovered after splenectomy 5 were found positive when re-inoculated with *Bartonella* blood and 1 was positive when re-inoculated with *Bartonella* culture. Morphologically and clinically *Bartonella muris ratti* is very much different from *Bart. bacilliformis* of Oroya fever and from the "Erythrokonten"* of pernicious anaemia.

A. A.

REGENDANZ (P.) & KIKUTH (W.). Sur la *Bartonella muris ratti* (Mayer). [*Bartonella muris ratti.*]—*C.R. Soc. Biol.* 1928. May 25. Vol. 98. No. 17. pp. 1578-1579.

PINTO, FARIA, and O. CRUZ, Jr., found that rats at Rio de Janeiro exhibited infection with *Bartonella muris ratti* after removal of the spleen; but in the present authors' experiments no evidence of *Bartonella* appeared in 5 Rio de Janeiro rats, or in an exceptional 3 of 25 wild rats from the suburbs of Manguinhos, subsequent to splenectomy. These results show that in South America, as in some other parts of the world, latent infection with *Bartonella muris ratti* is not universally predicable for the rat. That *Bart. muris ratti* and *Bart. bacilliformis* are distinct is shown in the following series of experiments: 2 despleeniated white rats inoculated with *Bart. bacilliformis* (about 1 cc. of a culture intravenis) did not develop infection; several weeks afterwards the same two rats, along with a third merely despleeniated white rat and a control rat, were inoculated with blood from a rat infected with *Bart. muris ratti* with the result that all three white rats became infected and died of haemolytic anaemia, and the control rat was unaffected.

A. A.

*The Erythrokonten described by Dr. V. Schilling in *Klin. Woch.* (April 22. No. 17. p. 785) are *Bartonella*-like bodies which he has found in the red cells in 39 cases of pernicious anaemia.

SORGE (G.). Sulle anemie da "Bartonella" dei ratti smilzati. [**"Bartonella" Anaemia in Splenectomized Rats.**].—*Biochim. e Terap. Sperim.* 1928. May 31. Vol. 15. No. 5. pp. 161-179. [37 refs.]

LAUDA attributed the often fatal haemolytic anaemia observed by Mayer to follow splenectomy in rats to a toxic or infective factor, and not to the splenectomy *per se*. MAYER, using Viennese rats, had found that a few days after splenectomy, or even ligation of the splenic vessels, haemolytic anaemia occurred simultaneously with the appearance of bacillary and cocci bodies (*Bartonella*) in the red cells, and he believed that the rats were infected with *Bartonella muris ratti*, which became manifest as a result of splenectomy (Mayer 1921).

The author repeated these experiments with Viennese and Catanese rats and found that the former reacted to splenectomy as above, but not the latter, and inferred that the former were infected with *Bartonella*, the latter not. Catanese rats were then fed with the liver of infected rats and others with the liver of splenectomized rats which had shown the above changes, but the results were negative. It was, however, a simple matter to infect the Catanese rats by subcutaneous, intraperitoneal, or intravenous inoculation of fresh aqueous extract of the liver of an infective splenectomized rat. The period of incubation, dating from the moment of splenectomy in infected animals, or of inoculation into the non-infected previously splenectomized, varied from a few hours to eight days. In the majority the "parasites" appeared in the blood in three days and the anaemia was pronounced in 6 days. Attempts to transfer the virus to monkeys, dogs, rabbits, guinea-pigs, and birds have been unsuccessful whether the animals had been splenectomized or not, but in the cases of splenectomized hamsters and mice intracardiac injection of blood rich in parasites yielded positive results, though the disease produced was less severe than in the rat and recovery took place.

Applying these findings to Oroya fever. The disease is essentially a severe progressive haemolytic anaemia; the symptoms and pathological changes closely resemble those of the "infective anaemia of the splenectomized rats." By severe involvement of the spleen in the one case, or removal of it in the other, a blocking of the reticulo-endothelial system occurs, the spleen as an organ of defence is eliminated, and the infection spreads.

Other examples given in support of this are the graver effects of experimental infection with trypanosomes in splenectomized rats as compared with controls, and the observation of KIKUTH of a *Cercopithecus* imported from Africa whose blood was systematically examined for two months and the animal then splenectomized. Ten days later a severe piroplasma infection arose which terminated fatally. Transmission to normal monkeys produced no demonstrable infection until splenectomy was performed, ZIEMANN is cited by KIKUTH (*Arch. f. Schiffs- u. Tropen-Hyg.* Bd. 31. 1927, p. 37) as having observed the same with *Piroplasma canis*.

H. Harold Scott.

REVIEWS AND NOTICES.

PETTIT (Auguste) [Professeur à l'Institut Pasteur, Membre de l'Académie de Médecine.] Contribution à l'étude des spirochétidés. Tome I. (I. Morphologie, Physiologie & Chimiothérapie des Spirochétidés. II. Genres & Espèces de Spirochétidés. III. *Spirochaeta icterohemorragiae*.) [Contribution to the Study of Spirochaetes.]—pp. iv+119, with 47 figs.+265, with 69 figs.+267, with 27 figs. & 14 plates (2 coloured). 1928. Vanves (Seine): Published by the Author, 70 rue Jullien. [80 francs.]

The number of publications dealing with spirochaetes has increased so rapidly in recent years that all students of this group will welcome the attempt made by Professor Pettit to collect together our present knowledge. The work is essentially a compilation rather than a critical revision, for the author considers that the present state of our knowledge is too imperfect for the preparation of a complete monograph of the group. Consequently the reader is presented with diverse points of view concerning classification, nomenclature, multiplication, life history, etc., and left to form his own conclusions. In some respects it is rather unfortunate that the distinguished author has not seen fit to give a more definite opinion on some of these questions, for amidst a number of conflicting views it is difficult for a reader without a very special knowledge of the subject to appraise the value of evidence supplied to him with such impartiality. For example, the chapter dealing with the method of division in spirochaetes might convey the impression that these organisms multiply by longitudinal, as well as transverse, division, a view which has been generally abandoned for many years. Moreover, different names are employed for the same organism; e.g., the fowl spirochaete is referred to indiscriminately as *Sp. gallinarum* and *Sp. marchoux*.

The complete work will consist of six parts under the following headings:

1. Morphology, physiology and chemotherapy.
2. Genera and species.
3. *Spirochaeta icterohaemorrhagiae*.
4. Technique.
5. Bibliography.
6. Index.

The present volume contains the first three parts, each of which is complete in itself.

Part 1, comprising 119 pages, deals with general questions and a few of the chapters have been written by other workers. Thus DELAMARE contributes an account of his method of measuring the length and height of the curvatures of spirochaetes as an aid to the morphological identification of these organisms. The type of spiral is described by COMANDON, who finds that all the spirochaetes examined by him have a right handed spiral, like that of an ordinary corkscrew, and the same author collaborates in the chapter dealing with motility. FOURNEAU contributes an interesting account of chemotherapy in spirochaetal infections.

Part 2, of 265 pages, contains a description of the hitherto described genera and species of spirochaetes, both free living and parasitic. The author, for the most part, retains the nomenclature used in the original descriptions, and commences with an account of the free living spirochaetes, special attention being devoted to the forms resembling *Leptospira icterohaemorrhagiae*. This is followed by an account of those living either as commensals or parasites, the organisms being arranged with relation to the animals in which they have been observed. Many of the descriptions are accompanied by line drawings of the organisms and information concerning their occurrence and biology.

Part 3, of 267 pages, deals entirely with *Spirochaeta icterohaemorrhagiae* and contains a detailed account of the subject based largely on the classical monograph by MARTIN and PETTIT, which is brought up to date.

In a compilation of this nature it is unavoidable that a few inaccuracies should have crept in, but these do not seriously detract from the value of the book, which will be of very great assistance in future studies of this group, and the author is to be congratulated on the manner in which a work representing such an amount of labour has been accomplished.

E. Hindle.

HERMANS (E. H.). [Hoofd v.d. Dermatol. afd. v.h. Ziekenhuis voor Scheeps- en Tropische Ziekten te Rotterdam.]—**Framboesia Tropica.**—191 pp. With 37 figs. on 10 plates. 1928. H. J. Paris, Amsterdam. [7s. 6d.]

This monograph is a useful study of the problem of yaws. The literature on the subject is treated in all its aspects and special reference is given to the views of Dutch observers. The discussion of the relationship between yaws and syphilis is of great interest. Although both conditions are akin to each other and although we are unable with our present means to distinguish with certainty the *Treponema pallidum* from the *Tr. pertenue*, the author thinks that the history, the geographical distribution, the clinical picture and other factors militate against the views of those authors who regard yaws as a variety of syphilis. Histologically the author sees a marked difference between yaws and syphilis, since yaws commences as a rule in the superficial layers of epidermis and the bloodvessels in the papillae show very slight changes, while in syphilis there is much thickening of the papillae and the blood vessels are typically affected. In yaws the spirochaetes can be found mainly in the epidermis especially amongst the prickle cells of the malpighian layer. In syphilis they are most numerous in the deepest part of the epidermis and in the corium. The author finds that besides the typical plantar and palmar keratosis, there is extensive scar formation, which sometimes interferes with the mobility of large articulations (especially of the elbow) and is characteristic of yaws. He also ascribes to yaws a contracture of the fourth and fifth fingers, which is very common on the Moluccas and formed a connecting link between yaws and rhinopharyngitis mutilans (gangosa) on the one hand and between yaws and gonorrhoea on the other.

Diseases of bones as a result of yaws are much more common in the Dutch East Indies than syphilitic bony changes in Europe, while affections of the internal organs, meninges and brain are rarely met with as sequelae of yaws. Locomotor ataxia, G.P.I. and aneurysms never occur in connexion with this disease.

While discussing the treatment of yaws, the author gives a warning against the indiscriminate use of salvarsan, although he is quite aware of the excellent momentary results of this therapy. (In the Dutch East Indies, where the native population is systematically treated with neosalvarsan, more than 1½ millions of injections have been given since 1919.) He points out that in syphilis as well as in yaws, in those cases where the secondary skin eruption is more intense, the late symptoms are slight and he suggests that, owing to the suppression of the secondary yaws by the action of salvarsan, this disease may in future assume a different and possibly a more severe course.

He therefore advises the injection of neosalvarsan only after the complete development of the secondary yaws and then only in combination with potassium iodide, mercury and bismuth.

H. Lwow

AUSTEN (E. E.) [Major, D.S.O., Keeper, Dept. of Entom.] **The House-Fly: its Life-History, Importance as a Disease Carrier and Practical Measures for its Suppression.** Third Edition. British Museum (Natural History). Economic Series. No. 1A. 71 pp. With 13 figs. 1928. London: Printed by Order of the Trustees of the British Museum. [1s.]

Amendments in the new edition of this solicitously careful work are rather of the kind that if the house-fly were a thing of beautiful and dignified associations, might be described as painting the lily or adding another hue unto the rainbow. One of the most conspicuous additions is a reproduction of a photograph of the insect's eggs, greatly enlarged—this at least confirming the ancient truth that there is nought so vile as to be without some small claim to grace. In the text we notice some minor touches that add precision to the impeachment of the insect before the tribunal of pathology, some additions to methods of forestalling maggots in dumps of town-refuse, and a description of a comparatively recent American method of destroying adult flies in large commercial and industrial buildings by means of calcium cyanide, the powder being distributed at night, when the creatures at last are at rest, at the rate of half an ounce per 1,000 c. ft. of space. It is to be noticed also that the author's peroration is now charged with a burden more of indignation than of sorrow, at the thought of the "pastrycook's wares in shops" still "freely exposed to contamination by house-flies" in these islands—just as they were in the days of Chaucer's gentle Roger.

A. Alcock.

YAWS AND SYPHILIS (CORRESPONDENCE).

TANGANYIKA TERRITORY: Annual Medical & Sanitary Report for Year ending 31st December 1926. pp. 109–110. **Extract from the Annual Report on Yaws and Syphilis.**

"On page 658 of the August number of the *Tropical Diseases Bulletin* [1928] there is a mild criticism of an account of some cases treated with Bismuth sodium potassium tartrate and published under my name in the Annual Medical Report for Tanganyika Territory 1926.

"The diagnoses, treatment, conclusions and written account were entirely the work of an Indian sub-assistant surgeon with medical qualifications, and I did not see the cases, being engaged elsewhere on sleeping sickness work. By some oversight or clerical error it was published under my name. On seeing the printed Annual Medical Report, I disclaimed authorship, but it was of course too late to remedy the error. It is a small matter, but no one wishes to have the work of others, whether good or bad, published as a scientific contribution of his own."

J. F. CORSON,

Asst. Bacteriologist, Tanganyika Territory.

21 August, 1928.

ERRATUM.

Vol. 25. No. 7. p 577. KIKUTH & TROPP's paper on Bird Malaria Studies: the dosage of adrenalin used to induce artificial relapse in birds was 0.06 *mgm.* not 0.06 gm. as printed in line 7 of summary.

BUREAU OF HYGIENE AND TROPICAL DISEASES.

TROPICAL DISEASES BULLETIN.

Vol. 25.]

1928.

[No. 11]

YELLOW FEVER.

BULLETIN OFFICE INTERNATIONAL D'HYGIÈNE PUBLIQUE. 1928. June. Vol. 20. No. 6. pp. 866-871. Résultats de la conférence de la fièvre jaune à Dakar (23 avril-1 mai 1928). [**Results of the Yellow Fever Conference at Dakar.**]

LE MOIGNIC. Une conférence sur la fièvre jaune (Dakar, 23-28 avril 1928).—*Presse Méd.* 1928. July 25. Vol. 36. No. 59. pp. 939-940.

The reports of this conference which was held at Dakar, at the end of April, 1928, under the presidency of Dr. LASNET, are of considerable interest, as it included representatives from practically all the colonies on the West Coast of Africa.

The more important facts to which attention is called are the following :—

(1) The susceptibility of the rhesus monkey to yellow fever.

(2) The absence of leptospirae in African cases of yellow fever, a fact admitted by NOGUCHI himself, and consequently the doubtful value of any vaccine prepared from these organisms.

(3) The importance of albuminuria in the diagnosis of abortive or early cases of the disease, and the necessity of repeated systematic examinations of the urine in all suspicious cases of fever, in natives, as well as Europeans, when there is any possibility of yellow fever being present.

(4) The frequency of the disease in the native population, especially in the Gold Coast and at Lagos, and consequently the necessity of applying the same prophylactic regulations to both the white and coloured community.

(5) The necessity of friendly co-operation between all the countries on the West Coast of Africa, in order to establish the best methods of dealing with outbreaks. The sanitary services should be in close relationship, and their officers should visit the various colonies in order to study local conditions; also in the future it is considered desirable to form an international health bureau at some convenient place on the West Coast.

(6) The yellow fever epidemic in Senegal has been effectively dealt with by the adoption of very strict sanitary regulations, but the port of Dakar is considered to require especial attention in view of its large mixed population and rapid growth.

The conference were also of the opinion that all cases of pestilential diseases occurring in West Africa should be notified by telegraph and without delay by the Governor of that colony to all other Governors of West African colonies. With regard to yellow fever, no case should be notified officially until the diagnosis has been confirmed either by inoculation into *Macacus rhesus* or by the development of definite

clinical symptoms ; or by post-mortem findings. A clear distinction should be drawn between imported cases of the disease and those in which the infection seems to have been acquired locally.

Attention is drawn to the fact that the rhesus monkey is very susceptible to yellow fever, and although the virus soon disappears from the blood of patients, yet if kept *in vitro* the virus will persist for an indefinite period [*ante*, p. 539] and may be sent to a central laboratory for testing.

Recent investigations have shown that yellow fever occurs in the native population in all forms, from very mild up to the severe fatal cases. The importance of this fact from an epidemiological view hardly requires emphasizing.

Finally, the conference called attention to the possibility of infection being acquired by the virus in the blood of yellow fever cases passing through the skin.

E. Hindle.

DUPONT. La fièvre jaune au Sine-Saloum en 1926. [**Yellow Fever in Sine-Saloum, Senegal, in 1926.**]—*Rev. Méd. et Hyg. Trop.* 1928. May-June. Vol. 20. No. 3. pp. 65-79. With 1 text fig.

A record of the cases of yellow fever in this district, dates of their appearance and notes on the symptoms. The paper should be read in its entirety by those interested in the epidemiology of this disease, as the observations clearly indicate the difficulty of this problem, especially in view of the great variation of the symptoms of yellow fever in different cases.

A summary of the results shows the great importance of anti-mosquito campaigns, for in the town of Kaolack, where larvae were continually being destroyed, there were only 3 or 4 cases amongst about 600 white population (0.5 to 0.7 per cent.) whilst in the small stations up country in the bush there were 18 to 22 cases amongst 199 whites, (9 to 11 per cent.)

E. H.

LASNET. Note sur la fièvre jaune au Sénégal en 1927. [**Notes on Yellow Fever in Senegal during 1927.**]—*Bull. Acad. Méd.* 1928. July 3. Year 92. 3rd Ser. Vol. 100. No. 27. pp. 758-764.

After an interval of fourteen years yellow fever reappeared in Senegal towards the end of 1926 and during 1927, between May and December. Excluding natives there were 190 cases, of which 135 died. These were all proved cases of the disease and in addition there were a number of suspected cases which were not sufficiently typical to be included in these totals, but were most probably yellow fever ; also, especially in the case of young children whose parents were attacked, suspicious cases of slight fever sometimes followed by mild jaundice and traces of albuminuria. With regard to the clinical symptoms, there was frequently no relation between the temperature and pulse during the early stages of the disease. Albuminuria occurred from the second or third day up to 24 to 30 gms. and peptones were also generally present. Death was generally preceded by anuria, or by haemorrhage of the stomach. The most favourable sign was urinary discharge, and a sudden fall in the quantity of albumin with the appearance of biliary pigments in the urine.

No effective treatment is known and Noguchi's vaccine and serum were found to be useless; 500 injections of bismuth salts were made with negative results.

The author also gives useful notes on the diagnosis of the disease and points out that it is practically impossible to be certain in the early stages. During epidemics, therefore, any febrile cases of unknown origin should at once be protected by mosquito nets in order to guard against the possibility of an infection being transmitted.

With regard to the sanitary arrangements, very strict measures were taken by the government in Senegal and any persons infringing the laws were liable to heavy fines and imprisonment for periods of three months to two years. These measures were mainly based on the well-known fact that the disease is transmitted by *Aedes aegypti*. Anti-mosquito campaigns were energetically carried out, and the public health budget was increased from 1,100,000 francs to 3,000,000 francs. Thanks to these measures, for which the author was mainly responsible, the spread of the disease in the Colony was arrested. Finally an extract is given of the results of the yellow fever conference.

E. H.

AUDIBERT. La fièvre jaune en Afrique occidentale française en 1927.

[**Yellow Fever in French West Africa in 1927.**—*Bull. Office Internat. d'Hyg. Publique*. 1928. June. Vol. 20. No. 6. pp. 883-885. [1 ref.]

A record of the number of cases arranged according to locality, time of year and race. The monthly distribution of the cases was as follows:

May	...	...	...	...	13 cases	7 deaths
June	...	...	...	...	25 "	12 "
July	...	...	...	...	12 "	9 "
August	...	...	...	...	24 "	21 "
September	...	...	...	...	41 "	29 "
October	...	...	...	...	46 "	32 "
November	...	...	...	...	23 "	19 "
December	...	...	...	...	6 "	6 "

[A total of 190 cases with 135 deaths is thus recorded, but these were exclusively amongst the foreign population and it is incredible that none should have occurred amongst the native population. See below, p. 847, for further notes on this subject by SOREL.]

E. H.

BUCHANAN (George S.). La fièvre jaune dans l'Afrique occidentale britannique. [**Yellow Fever in British West Africa.**—*Bull. Office Internat. d'Hyg. Publique*. 1928. June. Vol. 20. No. 6. pp. 872-878. [1 ref.]

A history of the recent yellow fever epidemic in the Gold Coast with notes on recent observations. Attention is drawn to the fact that in the Gold Coast epidemic at Accra, all European and Syrian cases occurred amongst those living in the native parts of the town, and when this white population was made to live in the European neighbourhood, no other cases were observed, except in a Syrian who disobeyed the regulations. The report should be read in its entirety by those interested in the subject.

E. H.

JAMES (S. P.). La fièvre jaune dans l'Afrique occidentale britannique. [**Yellow Fever in British West Africa.**]—*Bull. Office Internat. d'Hyg. Publique.* 1928. June. Vol. 20. No. 6. pp. 879-882. With 2 maps.

A record of the manner in which the yellow fever virus was first transported to Europe [*ante*, p. 539] and subsequently sent by HINDLE to the Pasteur Institute at Paris. Col. James, himself, transported the virus from London to Paris, where the disease is being studied in Professor PETTIT's laboratory. Attention is drawn to the importance of now being able to study the disease in European laboratories away from the natural localities in which it occurs.

Maps of the Gold Coast and Nigeria are given to illustrate the localities mentioned by Sir GEORGE BUCHANAN [see above] from which yellow fever cases were recorded in recent epidemics. The most disquieting feature of these records is the occurrence of cases of yellow fever in towns 70 to 80 miles from the coast, and indirect evidence that the disease seems to have extended its range in recent years. It is suggested that Ibadan, a large town in Nigeria surrounded by a densely populated neighbourhood, may be an endemic centre in Nigeria.

E. H.

VAN CAMPENHOUT (J.). La fièvre jaune au Congo belge. [**Yellow Fever in the Belgian Congo.**]—*Bull. Office Internat. d'Hyg. Publique.* 1928. June. Vol. 20. No. 6. pp. 886-896. With 2 maps. [1 ref.]

Two cases were recorded at Matadi in 1912 and another six in 1917, but these seemed to have been sporadic cases, and the disease evidently did not become established amongst the native community, since in the recent outbreak the natives showed no immunity.

From December 12th, 1927 to the end of January, 1928, there were 41 cases at Matadi: 21 in Europeans, of whom 11 died, and 20 in natives, with 15 deaths, followed by an isolated case in February. The disease seems to have been introduced by steamers from either Senegal or French Guinea, as the ships coming from there remain 3 or 4 days at Matadi. The symptoms were typical. Treatment with electrargol is said to have given good results, according to the local medical officer, Dr. CHRISTIAENS.

The methods taken by the Government to cope with the disease are described in detail. With regard to the future, the position at Matadi is considered to be disquieting and there seems a possibility of further outbreaks occurring during the next hot season. Consequently, especial attention is being devoted to the destruction of mosquitoes at this port.

Finally, the writer gives a list of the number of places, extending from Matadi to Tanganyika, at which *Aedes aegypti* has been captured and draws attention to the danger of yellow fever spreading to the interior of the colony and thence across Africa.

E. H.

WEHRLE (W. O.). Das Gelbfieber in Liberia 1925 und 1927. [**Yellow Fever in Liberia in 1925 and 1927.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1928. Aug. Vol. 32. No. 8. pp. 401-406.

Until 1925 Liberia was supposed to be free from yellow fever, but the author brings forward convincing evidence in support of the view

that the disease has been endemic in that region for a very long time, and occasionally assumes the form of an epidemic, as in 1925 and 1927. The relatively small European population and scarcity of doctors make it difficult to get definite information, but the existence amongst the natives of a disease known as "black jaundice" or "yellow jaundice," associated with black vomit, is very suggestive of yellow fever.

The author gives records of a number of cases of yellow fever in Monrovia, among Europeans, Syrians and natives. The mortality amongst the former was 100 per cent., and it is of interest that cases which had received prophylactic inoculations of NOGUCHI's leptospiral vaccine succumbed to the infection. Moreover, the serum provided by the Rockefeller Institute was also found to be entirely without effect.

Finally, it is remarked that in the near future there is no likelihood of the disease being suppressed in Liberia by means of sanitary measures, for even in the British and French Colonies such measures have only succeeded in a few places, such as Sierra Leone.

E. H.

SOREL (F.). Epidémie de fièvre jaune à Dakar en 1927. [**The Yellow Fever Epidemic at Dakar in 1927.**—*Bull. Soc. Path. Exot.* 1928. July 11. Vol. 21. No. 7. pp. 503-508.

——. La fièvre jaune chez les indigènes à Dakar en 1927. [**Yellow Fever among the Natives at Dakar in 1927.**—*Ibid.* pp. 509-511. With 1 chart in text.

The author, who was in charge of the campaign against yellow fever in Senegal, gives an interesting discussion of the 1927 epidemic. Concerning the number of cases, it is impossible to arrive at any definite conclusions, for when a disease of this nature suddenly appears after a long interval, many of the early cases are not diagnosed. Moreover, the symptoms are uncertain and not easily recognized, so many cases may occur without being recognized. A very good example of this was furnished by a Syrian who came into hospital in December, 1927, when the authorities were familiar with the disease. The case was first diagnosed as one of yellow fever and then this opinion was definitely rejected. Fortunately, mosquitoes had been fed on this patient by Dr. SELLARDS, and this observer in conjunction with MATHIS and LAIGRET, produced typical yellow fever in a *Macacus rhesus* which was bitten by these mosquitoes. [*Ante*, p. 538. Incidentally, this is the strain which was brought back to this country, as recorded by SELLARDS and HINDLE, *ante*, p. 539.] It is evident, therefore, that cases of yellow fever occur without being diagnosed and until there is some certain method of recognizing the disease, it is not possible to estimate to what extent it is present in any given community.

The second paper deals with the possibility of yellow fever occurring amongst the natives of Senegal. The mortality curve for 1927 showed a sharp rise in June and July, when the yellow fever epidemic was starting, and there is a strong suspicion that the very large increase in the number of deaths among the natives at this time was due to unrecognized yellow fever.

E. H.

BAUVALLET (H.). Index stegomyia et fièvre jaune. [**Stegomyia Index and Yellow Fever.**]—*Bull. Soc. Path. Exot.* 1928. Apr. 18. Vol. 21. No. 4. pp. 325-327.

The author gives tables indicating the number of breeding places containing *Stegomyia* larvae which were destroyed at Cotonou (Dahomey) during the years 1925, 1926, and the first seven months of 1927. Taking the number of habitations as 3,000, the index figure indicating the number of breeding places found increased from 1.17 to 2.74 per cent. Probably as a result of these energetic prophylactic measures, no cases of yellow fever were observed during this period.

E. H.

PUBLIC HEALTH REPORTS. 1928. Aug. 3. Vol. 43. No. 31. pp. 2031-2040.—**Yellow Fever Investigations in West Africa** [p. 2031.] **Yellow Fever in British West Africa. Report prepared by the Colonial Office, London, and Communicated to the May, 1928, Session of the Permanent Committee of the International Office of Public Hygiene by Sir George Buchanan, Delegate for Great Britain** [pp. 2031-2037]. **Resolutions of the West African Conference on the Control of Yellow Fever and other Diseases** [pp. 2037-2040].

The first part of this report is a translation of the article reviewed above p. 845.

The second part is a translation of the resolutions of the West African yellow fever conference. [See above, p. 843].

E. H.

BAUER (Johannes H.) & HUDSON (N. Paul). **The Incubation Period of Yellow Fever in the Mosquito.**—*Jl. Experim. Med.* 1928. July 1. Vol. 48. No. 1. pp. 147-153. [7 refs.] [Commission on Yellow Fever, Rockefeller Foundation, Lagos, Nigeria, West Africa.]

Working with a West African strain of yellow fever, the authors found that the virus was present in an infectious form in *Aedes aegypti* throughout the extrinsic incubation period, as demonstrated by the inoculation of the bodies of mosquitoes into normal monkeys at daily intervals after having been fed on an infected animal. At a temperature varying between 74° and 90° F., the mosquitoes became infective, in one experiment on and after the ninth day, and in two experiments, on the twelfth day after having fed on an infected animal. The pathological changes produced by inoculation of infected mosquitoes, at all stages of infection, were typical of experimental yellow fever. [The results of previous observers suggested that 12 days was the usual incubation period, but the above results show that under certain conditions this period may be as short as nine days. Doubtless, varying degrees of temperature would influence the length of the incubation period, as in the case of other infections transmitted by biting flies.]

E. H.

BAUER (Johannes H.). **The Transmission of Yellow Fever by Mosquitoes other than *Aedes aegypti*.**—*Amer. Jl. Trop. Med.* 1928. July. Vol. 8. No. 4. pp. 261-282. [14 refs.] Abridged version in *Jl. Amer. Med. Assoc.* 1928. June 30. Vol. 90. No. 26. pp. 2091-2092.

An interesting account of experiments on the transmission of yellow fever conducted at Lagos with the object of seeing if any other species

of mosquito could serve as a carrier of this disease in addition to *Aedes aegypti*.

The results indicate that *Aedes luteocephalus* and *Aedes apicoannulatus* transmit yellow fever in all respects in the same manner as *A. aegypti*. Two lots of *Eretmopodites chrysogaster* were fed on infected monkeys and one lot produced a typical infection when fed on a normal monkey. The other lot failed to infect animals by their bite, but the insects were proved to contain the virus, as they produced infection when ground up and injected into a normal monkey twenty-four days after the original infecting feed.

A. luteocephalus is one of the most common species of *Aedes* breeding in trees near human habitations and DUNN found that 74 per cent. of those around Lagos harboured this species. Consequently it must be regarded as a source of danger in the spread of yellow fever. *A. apicoannulatus* is also a breeder in tree holes, and although not so common as the former, was found in 16 per cent. of the tree holes in Lagos. Unlike *A. aegypti* and *A. luteocephalus*, this species is not restricted to the immediate neighbourhood of human habitations, but also occurs in the jungle away from any villages.

Eretmopodites chrysogaster, which under certain conditions obviously might serve as a carrier, does not frequent tree holes, but breeds in cut bamboos, old disused tins and similar localities. It is a voracious feeder and will readily bite man in full daylight as well as at night.

The two monkeys infected with yellow fever by the bites of these insects both showed an incubation period of ten days, which is abnormally long, but the pathological changes produced were identical with those in typical cases of the disease. It is noteworthy that a mosquito belonging to an entirely different genus from *Aedes* should thus be capable of acting as a carrier.

Experiments with *Aedes apicoargenteus* gave entirely negative results, both by biting experiments and the inoculation of the contents of insects that had fed on infected animals.

Aedes longipalpis, *A. welmani* and *Culex nebulosus* refused to feed on monkeys and therefore could not be tested as regards the possibility of their acting as carriers of infection.

E. H.

KLIGLER (I. J.). **Attempts to infect *Aedes aegypti* (*Stegomyia fasciata*) of West Africa with *Leptospira icteroides* by Feeding on Infected Guinea Pigs and on Culture Suspensions.**—*Amer. Jl. Trop. Med.* 1928. July. Vol. 8. No. 4. pp. 283-297. [3 refs.] [Lab. West African Yellow Fever Commission, Lagos, Nigeria.]

Using the Palmeiras 3 strain of *Leptospira icteroides* and *Aedes aegypti* from both West Africa and Palestine, the author found that the leptospirae never remained alive in the gut of the mosquito for more than ten to twelve hours, and after sixteen hours disappeared entirely. Numerous transmission experiments with these insects gave uniformly negative results indicating that *Aedes aegypti* is not the carrier of *L. icteroides*. [These results confirm those of GAY and SELLARDS, who used an Havana strain of mosquitoes and a rather more virulent strain of *L. icteroides*. *Ante*, p. 104.]

E. H.

KLIGLER (I. J.) & ASHNER (M.). **The Leptospiricidal Power of Extracts of *Aedes aegypti* (*Stegomyia fasciata*).**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1928. Aug. 22. Vol. 22. No. 2. pp. 181–184. With 2 figs. on 1 plate. [8 refs.] [Dept. Hyg., Hebrew Univ., Jerusalem.]

The authors ground up a number of *Aedes aegypti* with distilled water and filtered the emulsion through a Zeitz filter. The filtrate was found to kill cultures of *Leptospira icteroides* in dilutions of 1 in 4 to 1 in 8. The property was partly destroyed by heating to 60° C. for 30 minutes. These results confirm the generally accepted view that this organism cannot live in *Aedes* for more than a few hours.

E. H.

PETTIT (Auguste) & STEFANOPOULOU (Georges). Absence d'anticorps pour les spirochètes icterigènes et voisins, dans le sang des sujets atteints de fièvre jaune. [**Absence of Antibodies against Spirochaetes in the Blood of Yellow Fever Patients.**]—*C. R. Soc. Biol.* 1928. June 29. Vol. 99. No. 22. pp. 256–258.

In the course of a visit to Senegal last year, the authors collected the serum of a number of yellow fever patients, six during the disease and eight during convalescence, or after recovery. These sera were tested against *Leptospira icteroides*, *L. icterohaemorrhagiae*, *L. pseudo-icterohaemorrhagiae*, *L. hebdomadis*, and *L. autumnalis* types A and B. In every case there was no sign of the presence of any lysins, agglutinins, or immune bodies for any of the above mentioned organisms.

E. H.

FOWLER (Sir James K.). **Annual Report of the Beit Memorial Trustees.**—*The Times.* 1928. July 16th. p. 9.

This report contains a record of unpublished experiments by HINDLE, proving that the yellow fever virus, in the liver or blood of an infected monkey, may be dried *in vacuo*. In this dried state the virus seems to retain its properties indefinitely, and even in the presence of air was found to be still active after three to four weeks.

E. H.

PETTIT (Auguste), STEFANOPOULOU (G.) & AGUESSY (Cyrille). Le virus de la fièvre jaune. [**The Yellow Fever Virus.**]—*C. R. Soc. Biol.* 1928. June 29. Vol. 99. No. 22. pp. 258–260.

The authors briefly record their experiments with the Senegal virus used by SELLARDS and HINDLE [*ante*, p. 539], which was sent to the Pasteur Institute by the reviewer. Up to date nineteen *Macacus rhesus* have been infected by the inoculation of infected liver material and the symptoms and pathological appearances agree with those previously described [*loc. cit.*, pp. 537 and 539].

Bismuth compounds were administered to four monkeys as a preventive and in each case completely checked the development of the disease. No details are given but further work is in progress. Four others were inoculated with a vaccine prepared from the liver of yellow fever monkeys and found to be protected.

These results confirm HINDLE's discovery of the protective value of yellow fever vaccines prepared from the livers of infected animals, after either killing or attenuating the virus [*loc. cit.*, p. 539].

E. H.

PETTIT (Auguste), STEFANOPOULOU (Georges) & KOLOCHINE (Constantin).

Sur la réceptivité des singes au virus de la fièvre jaune. [**The Susceptibility of Monkeys to Yellow Fever.**]*—C. R. Soc. Biol.* 1928. June 29. Vol. 99. No. 22. pp. 260–261.

The authors inoculated large doses of yellow fever virus into the following African monkeys with negative results:—2 *Cercopithecus griseo-iridis*; 2 *Cynocephalus hamadryas*; and 1 *C. papio*. Two *Macacus sinicus* were infected. One succumbed to the disease 4 days after being inoculated; the other suffered from a mild attack and recovered.

E. H.

MARCHOUX (E.). L'homme est moins sensible que le *Macacus rhesus* au virus de la fièvre jaune. [**Man is less Susceptible to the Virus of Yellow Fever than Macacus rhesus.**]*—C. R. Acad. Sci.* 1928. July 23. Vol. 187. No. 4. pp. 260–261.

According to the author, Dr. BEUWCKES at the yellow fever conference this year, made the surprising statement that the yellow fever virus would pass through the intact skin of the monkey, but not through the mucous membranes. Experiments were made at the Pasteur Institute, Paris, with SELLARDS' and HINDLE's strain of the virus, and the results obtained were the opposite of those stated above. The virus placed on the intact skin of a monkey failed to infect, whilst the same virus placed on the conjunctiva, or on the scarified surface of the skin, produced typical yellow fever infections. Finally, the author states that through the bursting of a syringe, one of his colleagues received fresh yellow fever virus from a dead monkey on to his face and into his eyes, without contracting the disease.

[By a curious misprint, the number of experiment 2 is given as 3, in two places, thus somewhat confusing the results.]

With reference to the incident recorded at the end of the paper, the reviewer is strongly of the opinion that Dr. Marchoux' colleague was exceptionally fortunate, as indicated by the occurrence of laboratory infections, especially that of Dr. Adrian STOKES, in which the possibility of mosquito infection seems to have been absent.]

E. H.

PETTIT (Auguste), STEFANOPOULOU (Georges) & FRASEY (Victor).

Sérum anti-amaryllique. [**Anti-Yellow Fever Serum.**]*—C. R. Soc. Biol.* 1928. July 27. Vol. 99. No. 25. pp. 541–542. [1 ref.]

The authors have injected large quantities of infected liver material from monkeys dead of yellow fever, into two horses, two species of baboons (*papio* and *hamadryas*) and a *Cercopithecus*. Serum from each of these animals was mixed with yellow fever virus from the liver

of an infected monkey and after being in contact for 30 minutes, inoculated into *Macacus rhesus*. None of the five animals inoculated showed any signs of the disease, whilst a monkey inoculated with a mixture of infected liver and serum from a normal baboon, died of yellow fever on the eighth day.

[In addition monkey A suffered from a non-fatal attack of yellow fever, but it is not clear from the article what serum was used in this experiment.]

E. H.

ARAGÃO (Henrique de Beaurepaire). Observações sobre a febre amarella no Brasil. [**Observations on Yellow Fever in Brazil.**]—*Brasil-Médico*. 1928. July 7. Vol. 42. No. 27. pp. 727-729. With 2 text figs. [1 ref.]

The presence of some yellow fever cases in Rio de Janeiro afforded the opportunity of testing whether the same results could be obtained by inoculation of *Macacus rhesus* and *M. cynomolgus* in Brazil as in West Africa. Three *M. rhesus* were inoculated with the blood of patients, two on the second to third day of the disease and one on the third to fourth, and one with 2 cc. of a culture of *L. icteroides* isolated by NOGUCHI in Palmeiras (Bahia). None of the monkeys was affected. The author next inoculated a *M. rhesus* and a *M. cynomolgus* with 10 cc. of the blood of mild cases on the first-second day of the disease, 5 cc. intraperitoneally and 5 cc. intramuscularly. Both died, the former on the fifth day, the latter on the seventh, and the post-mortem findings were typical. The effects of the Brazilian yellow fever are the same as that in West Africa. In none of 15 cases of yellow fever could *L. icteroides* be found by direct examination of the blood or urine, or in cultures or sections.

The authors tried complement fixation tests in eight cases, with the serum of patients on the first and second days of the disease as antigen, and the sera of convalescents on the eighth to fifteenth days, but with negative results in all. The experiments are still in progress.

H. Harold Scott.

HOFFMANN (W. H.). Die Leber beim afrikanischen Gelbfieber. [**The Liver in African Yellow Fever.**]—*Virchows Arch. f. Path. Anat. u. Physiol.* 1928. Vol. 266. No. 3. pp. 769-787. With 11 figs. (1 coloured).

The author has studied the histology of the liver in a number of cases of yellow fever from West Africa and finds the appearances typical of the disease and identical with those observed in American cases. These changes are described in detail and illustrated by excellent figures. In the main the author's results agree with those previously described and in particular with KLOTZ and SIMPSON's, reviewed in this *Bulletin*, *ante*, p. 112. The fatty degeneration and intense destruction of the liver cells constitute the most characteristic features, and furnish a method of distinguishing yellow fever from infectious jaundice and certain cases of poisoning which may simulate that disease [*ante*, p. 542].

E. H.

HOFFMANN (W. H.). El diagnostico histo-patologico de la fiebre amarilla. [**The Histological Diagnosis of Yellow Fever.**]—*Sciencia Med.* 1928. Apr. Vol. 6. No. 4. pp. 153–159. With 6 figs. [Finlay Lab., Manila, Havana.]

This paper is a short statement of the author's well known description of the morbid histology of yellow fever. It is illustrated by six excellent microphotographic reproductions of the pathological changes set up, five of the liver and one of the kidneys. The former show well the fatty degeneration and necrosis of the cells of the liver, with an intermingling of a few apparently intact cells at the centre and at the periphery of the lobules; the lime casts in the renal tubules are clearly seen in the last picture.

So characteristic are these changes that the author affirms that in all doubtful cases in which death has occurred with any suspicion of yellow fever, a small portion of the liver and kidney should be removed for histological examination to clinch the diagnosis.

H. Harold Scott.

JUNIOR (Vianna). Considerações sobre a etiologia e prophylaxia da febre amarella. [**On the Aetiology and Prophylaxis of Yellow Fever.**]—*Brasil-Medico.* 1928. May 26. Vol. 42. No. 21. pp. 562–568. [5 refs.]

The author in this paper gives many quotations from the reports of various workers on the subject and concludes: (1) That the *Leptospira icteroides* of NOGUCHI is the causative organism of yellow fever; (2) That Pfeiffer's phenomenon as carried out by Noguchi and his co-workers confirms this aetiological relationship; (3) Prolonged cultivation or repeated inoculations of the *L. icteroides* render it more closely allied to *L. icterohaemorrhagiae* and "accounts for the failures of other investigators to obtain positive results;" (4) Cultures of *Leptospira* recently isolated from a human case are needed, if positive results are to be obtained [First catch your hare!]; (5) The possibility of transformation of saprophytic leptospirae from water into pathogenic forms suggests the hypothesis of a natural reservoir of the yellow fever virus.

[These conclusions have now been generally abandoned.]

H. Harold Scott.

AGRAMONTE (Aristides). Consideraciones acerca del agente etiológico en la fiebre amarilla. [**On the Causative Agent of Yellow Fever.**]—*Sciencia Med.* 1928. June. Vol. 6. No. 6. pp. 295–301. [13 refs.]

The author, who never believed in either the bacillus or *Leptospira icteroides*, and who has, with GUITÉRAS and others, again and again expressed his doubts, once more recapitulates his reasons for regarding the cause as still unknown. The *L. icteroides* shows no valid specific differences from *L. icterohaemorrhagiae* and no vaccine made with *L. icteroides* is of any value, either preventive or curative, in yellow fever.

H. Harold Scott.

HUDSON (N. Paul). **The Pathology of Experimental Yellow Fever in the *Macacus rhesus*. I. Gross Pathology. II. Microscopic Pathology. III. Comparison with the Pathology of Yellow Fever in Man.**—*Amer. Jl. Path.* 1928. Sept. Vol. 4. No. 5. pp. 395–405. With 3 figs. on 1 plate. [3 refs.]; pp. 407–418. [2 refs.]; pp. 419–429. With 20 figs. on 5 plates. [17 refs.]

The first of these articles comprises a description of the gross pathology of 68 *Macacus rhesus* which died of yellow fever, all having been infected in various ways with a strain of virus isolated from Asibi, an

African native. The gross findings showed no variations that could be attributed to the method of infection, whether by mosquito or direct inoculation. The principal lesions were jaundice, haemorrhage, and pallor of various parts, and the changes in the liver, spleen and kidney. The jaundice usually appeared as light yellow to lemon coloured, sometimes with a greenish tinge and was almost constantly present on the surface of the great vessels near the heart and on the larynx. It could often be seen in the upper part of the face and eyelids, and the tarsal conjunctivae showed distinct jaundice in 30 cases and slight colouring in 17 others. Pallor was often seen in the buccal, gastric, and intestinal mucosa.

Haemorrhages occurred in many parts of the body, such as the base of the teeth. Petechial haemorrhages in the form of bright red dots 2 to 4 mm. in diameter on the surface of the lungs were observed in about two-thirds of the monkeys examined. The stomach of about one-third of the animals contained variable quantities of more or less altered blood which sometimes blackened the whole stomach contents. No gross lesions could ever be found on the surface of the mucosa even when fresh red blood was present. The small intestine also showed similar haemorrhages in about one-fifth of the cases examined. The lungs practically always contained the cysts of a parasitic mite *Pneumonyssus griffithi*. The liver was always pale, either buff or yellowish "boxwood" colour, and after bleeding became either yellowish brown or cream coloured. The surface of sections appeared fatty and moreover the tissue of the liver was often soft and friable and obviously necrotic. The weight of the spleen was definitely increased in infected animals. Also the kidneys showed an increase in size over those of control monkeys. The kidneys, in section, constantly showed the presence of fine dull grey cortical rays, easily seen with the naked eye, contrasted with the surrounding pale brown tissue. The increase in the weight of the spleen seems to be due to congestion and in the kidneys to acute degenerative changes.

The second article is based on the study of 30 rhesus monkeys infected with the same strain of yellow fever. The liver was found to show fatty degeneration, necrosis, with the development of marked eosinophile staining properties. Nuclear changes were also conspicuous in many of the cells. Polymorphonuclear and endothelial leucocytes were commonly present. The renal epithelium showed fatty degeneration, cloudy swelling and necrosis, but no inflammatory cells could be found. The tubules contained hyaline, granular and, in a few instances, calcareous casts. The heart almost constantly showed fatty degeneration unequally distributed among the muscle fibres. The spleen showed congestion, diminution of lymphocytes and lymphoblasts, necrosis of lymph nodules and a marked endothelial response in the nodules and pulp. Fat was found in the necrotic areas and in the endothelial cells of the nodules and pulp. Regional lymphatic glands also showed necrosis and endothelial multiplication. The lungs and stomach gave evidence of haemorrhage without any inflammatory reaction, mild in degree and without any obvious lesions in the vessel walls. Necrosis with a polymorphonuclear reaction was common in the adrenal gland and rarely haemorrhages were also observed.

No marked changes were observed in the brain, pancreas and voluntary muscle. All examinations for bacteria, leptospirae or spirochaetes were negative and the lesions may be explained on the basis of a severe intoxication.

The third article comprises a careful comparison of the pathology of yellow fever in monkeys with that in human beings. With regard to the gross pathology, very similar processes are evident in the organs of human and monkey cases of yellow fever. Jaundice, haemorrhage of various parts, "black vomit," pallor, and fatty necrotic changes in the liver, acute degeneration of the renal parenchyma, splenic congestion and the urinary findings were present in both. Variations occurred in the intensity of these changes, but qualitatively there was a very striking parallelism as regards the jaundice, recent haemorrhages, and the appearance of the liver, kidney and spleen. The pathological histology of the two, based on the examination of 30 human cases and the monkeys recorded above, shows that fatty degeneration of the liver, kidney, heart and spleen is of the same type in man and monkey, but more extreme in the latter. Other degenerative changes in the liver, spleen and kidney are also similar, but necrosis of the adrenal glands is only rarely seen in man, although common in the monkey. In both, inflammatory cells are lacking in response to haemorrhage in any of the organs, and to changes in the kidney and heart. Polymorphonuclear and endothelial leucocytes are usually found associated with liver lesions on monkeys, but rarely in man. Haemorrhages and congestion tend to be more frequent and extensive in the liver, lungs and gastric mucosa in human cases, but in both cases the haemorrhages are focal, recent and without obvious lesions of the vessels. The necrosis of the liver is essentially midzonal with less altered cells towards the periphery of the lobules.

The appearances in both human beings and monkeys support the view that the lesions are the result of a severe intoxication, and no evidence could be obtained of any localization of the virus.

E. H.

CANNELL (D. E.). **Myocardial Degenerations in Yellow Fever.**—*Amer. Jl. Path.* 1928. Sept. Vol. 4. No. 5. pp. 431-443. [25 refs.] [Dept. Path. & Bact., Univ., Toronto.]

The author has made a detailed examination of the hearts of 29 human cases and nine monkeys infected with yellow fever. As recorded above, cloudy swelling, granular and fatty degeneration were found constantly in both, but primary inflammatory changes were not observed. Secondary response was seen in two human cases. The distribution and intensity of the degeneration was patchy and variable, fatty degeneration being most marked in the neighbourhood of the nuclei of the muscle fibres. The cause of the slow pulse is still uncertain but further investigation of clinical function and pathological changes in the bundle of His may lead to a possible solution of the problem. The heart lesions are identical in both human beings and *Macacus rhesus*; in themselves they are not sufficient to make a diagnosis of yellow fever.

E. H.

DE ARAUJO (Eduardo). O problema da etiologia da febre amarela. (Estudo analítico.)—*Brasil-Médico*. 1928. July 21. Vol. 42. No. 29. pp. 781-790. [88 refs.]

KALA AZAR.

Ross (William C.). **Report on the Kala Azar Survey in Patna City August–November, 1923.**—13 pp. With 1 folding map. 1928. Patna.

The paper describes a survey which was instituted in parts of Patna for the purposes of throwing light on factors which might influence the incidence of kala azar. The population of 7,897 holdings was investigated. They included 25,311 Hindus, 10,561 Mohammedans and 190 Christians. The returns showed 162 cases of kala azar which gave an incidence of 4·5 per thousand of population. Such factors as sleeping habits, domestic water-supply and occupation, did not appear to influence the occurrence of the disease. As regards site incidence, the distribution of the cases is roughly in proportion to the density of population. Of the 162 cases, 138 were single cases in separate houses, while only 24 multiple cases occurred in 11 houses. Religion was a more important factor, for amongst the 25,311 Hindus there were 95 cases and amongst the 10,561 Mohammedans 66 cases. The incidence amongst the former was therefore 3·7, and amongst the latter 6·2. During the 4 years 1920 to 1923, 3,076 cases were treated at the Patna hospitals. This gives for the population an incidence of 6·5 per thousand and 10·6 and 5·2 for Mohammedans and Hindus respectively. As the general mortality rate for the two classes for the whole of Bihar and Orissa for ten years is approximately the same, it is evident that there is an actual excess of incidence of kala azar amongst Mohammedans. The only fundamental difference from the health point of view of the two classes is in the eating habits, a fact which indicates to the author that the probable source of infection is in the food and that the parasite invades the body through the intestinal tract. Sex has little influence for, though more cases are seen amongst males, the reluctance of the people to reveal their female relatives suggests that the disease probably affects both sexes more or less equally. With reference to age, if the age distribution of the disease is considered with the age distribution of the population, it is found that kala azar is most common in children, but is at the same time very frequent in adults and cannot be considered to be characteristically a disease of youth. It is rarely seen below the age of two, though infants are at least as liable to be bitten by insects as adults. Malaria affects the youngest infants, so that it is very difficult, if not impossible, to reconcile the fact with any theory of insect transmission of kala azar. From the housing incidence as it revealed the condition of sanitation, the remarkable fact emerged that masonry houses, with masonry privies built according to the prevailing idea of progress, are of all houses the most unhealthy from the kala azar point of view. The poor man in his mud hut is thus much better off than his rich neighbour. The general conclusion is reached that the survey indicates that kala azar is not transmitted by biting insects, but that infection takes place through the intestinal tract.

C. M. Wenyon.

BHATTACHARYYA (Pasupati). **The Antimony Test in the Early Diagnosis of Kala-Azar.**—*Indian Med. Gaz.* 1928. Mar. Vol. 63. No. 3. pp. 123-126.

An examination of 51 cases of fever with enlargement of the spleen at the police hospital in Calcutta has convinced the author of the value of the antimony test in the diagnosis of early cases of kala azar. Apart from very chronic cases of malaria, tubercle or syphilis, cases of fever other than kala azar do not give a positive result.

C. M. W.

BOSE (A. N.), DASTIDAR (S. K. Ghosh) & BAGCHI (B. N.). **Observations on the Antimony (Urea-Stibamine) Test for Kala-Azar.**—*Indian Med. Gaz.* 1928. July. Vol. 63. No. 7. pp. 370-372. [5 refs.] [Prince of Wales's Med. Coll., Patna.]

The authors have experimented with the antimony test for kala azar, employing urea stibamine. From the study of a number of diseases they conclude that the best result is obtained by using a 1 in 10 dilution of serum and a 4 per cent. solution of urea stibamine. With these concentrations the reaction appears to be a specific one for kala azar serum.

C. M. W.

CHOPRA (R. N.) & CHAUDHURI (S. G.). **Studies in the Physical Properties of Different Blood Sera. Part I. Iso-Electric Points of Blood Sera and their Significance in the Antimony Test for Kala-Azar.**—*Indian J. Med. Res.* 1928. Apr. Vol. 15. No. 4. pp. 895-905. [21 refs.] [Calcutta School of Trop. Med., Calcutta.]

The authors describe a method for the determination of the iso-electric points of albumin and globulin in serum under different pathological conditions and have shown that these are 5.5 and 3.8 respectively. In some lepers and in kala azar cases the iso-electric point of albumin is 4.0. The precipitate formed by the addition of a solution of urea stibamine to kala azar serum is mainly euglobulin. The antimony test for kala azar can be explained on the basis of no change in the iso-electric points, increase in the globulin-albumin ratio and diminution of buffer reaction.

C. M. W.

GILKS (John L.). **Kala-Azar.**—*Colony and Protectorate of Kenya. Ann. Med. Rep. for the Year ending 31st December, 1921.* p. 86.

Two cases of kala azar as contracted in the North Frontier District of Kenya are described. The first case was that of an Administration Cadet on his first tour of service. With the exception of war service in France, he had never been out of England before he came out and was stationed at the Northern Frontier. Diagnosis was made by liver puncture. The second case was in a Somali woman from the same district.

C. M. W.

NAPIER (L. Everard) & GUPTA (C. R. Das). **Indian Kala-Azar in a Newly-Born Child.**—*Indian Med. Gaz.* 1928. Apr. Vol. 63. No. 4. pp. 199–200. With 1 text fig. [5 refs.]

The paper describes a case of kala azar in an infant in its eighth month of life. The history of the case, the size of the spleen and the condition of the blood indicated that the infection had lasted at least 4 months. The child had been breast fed from birth, while the mother and another child 3 years of age were quite healthy. The incubation period in this case was certainly less than 3 months.

C. M. W.

CHOPRA (R. N.), GUPTA (J. C.), MULICK (M. N.) & GUPTA (A. K. Dutt). **Urea-Stibol in the Treatment of Kala-Azar.**—*Indian Med. Gaz.* 1928. May. Vol. 63. No. 5. pp. 252–253. [1 ref.] [Carmichael Hosp. for Trop. Diseases, Calcutta.]

J. C. DAS and S. C. BHAWAL introduced to the authors a compound called "urea-stibol" which they claimed to be a salt of urea and p-amino-phenyl-stibinic acid and not p-carbamino-phenyl-stibinate of ammonia, which is the chemical name of "urea stibamine." The pharmacological action of "urea-stibol" was similar to those of other pentavalent aromatic compounds of antimony, while its toxicity in white mice varied between 220 and 230 mgm. per kilogram of body weight when administered intravenously. Tested in fifteen cases of kala azar it gave results which were in no way inferior to those obtainable with "urea-stibamine" or "stiburea." The substance is a white hygroscopic powder easily soluble in water, forming a clear deep brown solution.

C. M. W.

RAY (Iyotis Chandra). Intrakutanreaktion zur Diagnose der experimentellen Leishmaniosen (Kala-Azar, Orientbeule). [**An Intracutaneous Reaction for Diagnosis of Experimental Leishmaniasis.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1928. July. Vol. 32. No. 7. pp. 369–376. [5 refs.] [Inst. for Ship & Trop. Diseases, Hamburg.]

Various types of antigen were prepared from cultures of *Leishmania tropica* and *L. donovani*. With these the possibility of obtaining a skin reaction in hamsters infected with *L. donovani* and *L. tropica* was tested. It was found that a specific reaction was given by the hamsters, as also by rabbits which had been immunized with cultures.

C. M. W.

MUKHERJEE (Harendra Nath). **A Simple Method for the Finding of Leishman-Donovan Bodies and Malarial Parasites in the Venous Blood.**—*Calcutta Med. Jl.* 1928. Mar. Vol. 22. No. 9. pp. 487–488. [4 refs.] [Carmichael Med. College, Calcutta.]

The fact that the corpuscles in blood from kala azar and malaria cases sediment rapidly may be utilized for the detection of malarial parasites or leishmania. About 1 cc. of citrated or oxalated blood taken from a vein is allowed to stand in long serological pipette tubes for 3 to 4 hours. With a fine capillary pipette a little of the clear plasma just above the red blood cell deposit, together with about 1 mm. of the topmost layer of red blood cells, is removed and placed

on a clean slide. A film is made and stained in the usual way. In sedimentation the uninfected red cells are at the bottom, those with malarial parasites next and the leucocytes in which leishmania may occur above these.

C. M. W.

MAYER (Martin) & RAY (Jyotis Chandra). Züchtung und Differentialdiagnose verschiedener Leishmanien (Kala-Azar, Orientbeule und brasilianische Leishmaniose) auf festen Nährböden.—[**Cultivation of Various Leishmania on Solid Media. Their Differential Diagnosis.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1928. June. Vol. 32. No. 6. pp. 277-287. With 19 text figs. [1 ref.] [Inst. for Ship & Trop. Diseases, Hamburg.]

By means of the blood agar plate method of culture of NÖLLER (see this *Bulletin*, Vol. 10, p. 247) the authors have shown that different strains of leishmania produce different types of growth. With *Leishmania donovani* narrow thick streaks without true lateral outgrowths are obtained. A strain of *L. tropica* from Palestine grew luxuriantly, the streak giving off parallel, but never branching outgrowths, while two strains from Turkestan, the one more luxuriant than the other, formed outgrowths in the form of a network. A strain of S. American cutaneous leishmania grew as a thin surface film without outgrowths. Furthermore the arrangement of the flagellates at the edge of the growth as shown in impress preparations varied with the strains, while there were recognizable differences in the size, shape, staining reaction, nuclear structure and flagella of the individual flagellates.

C. M. W.

HINDLE (Edward) & THOMSON (J. Gordon). *Leishmania infantum* in Chinese Hamsters.—*Proc. Roy. Soc.* 1928. Aug. 1. Ser. B. Vol. 103. No. B 724. pp. 252-257. With 8 figs. on 2 plates. [4 refs.]

The paper describes the lesions produced in hamsters inoculated with a strain of *Leishmania donovani* of Mediterranean origin. The strain employed was one of those used by YOUNG and HERTIG who have noted a similar response in hamsters (*ante*, p. 424). In contradistinction to hamsters inoculated with strains of *Leishmania donovani* of Chinese origin which develop a generalized infection progressing in intensity till the time of death, with large numbers of parasites in the spleen, liver and bone marrow, those inoculated with the Mediterranean virus acquire at first a generalized infection which subsides, its place being taken by a peripheral one of the extremities and the testis. It appears that the course of the infection following intraperitoneal inoculation is an infection of the lymphatic glands followed by invasion of the liver, spleen and bone marrow, causing a generalized infection during which parasites frequently appear in the peripheral blood. Later the organisms disappear from the viscera and become localized in the tissues surrounding one or more of the distal joints of the limbs and in the tail, often producing great enlargement of these regions. The testes also become parasitized and occasionally show abscess formation. The ears and nose of a certain number of animals also show thickening, followed by ulceration. Intratesticular inoculation was followed by the same series of events. In sections of the testis of one of the hamsters it was found that there was a marked

increase in the cells in the inter-tubular spaces. These consisted of large mononuclears with intensely eosinophile cytoplasm, small connective tissue cells and a few plasma cells. No parasitized clasmatocytes were seen in the inter-tubular spaces. In certain areas the lumen of the tubule was obliterated with polymorphonuclear cells, probably the result of some secondary inflammatory condition. The sperm mother cells of the outer zone of these inflamed tubules sometimes contained numerous leishmania. No marked changes were observed in the interstitial cells of the epididymis and no parasites were found in the intertubular spaces or in the lining cells of the tubules. Sections through the feet showed that the thickening was mainly due to great proliferation of cells, mostly parasitized clasmatocytes round the ankle joint, and these infiltrated the tissues between the muscles and ligaments, but did not extend into the cavity of the joints nor into the tissues surrounding the joints of the toes. Furthermore, the bone-marrow of the lower ends of the tibia and fibula was almost entirely replaced by parasitized clasmatocytes. The marrow of the tarsals and metatarsals was in a similar condition. Examination of subcutaneous tissues of the skin in other parts of the body did not reveal parasites except in the case of the margins of the ears when obvious lesions were present. With the Chinese strain distribution of parasites in the subcutaneous tissues of the whole body is commonly found.

C. M. W.

BRAHMACHARI (Upendra Nath) & BANERJEE (Siris Chandra). **A Rare Case of Dermal Leishmanoid.**--*Indian Med. Gaz.* 1928. July. Vol. 63. No. 7. pp. 389-390. [2 refs.]

About 2 years after he came under treatment for kala azar, of which he was apparently cured by injections of sodium antimony tartrate, the patient noticed an erythematous patch over the bridge of the nose. It extended and there developed on the area a few papules without any sign of depigmentation. Scrapings from the area showed a few leishmania. The case was evidently a type of the disease previously described by the first author as dermal leishmanoid. There was no fever or enlargement of the spleen and no sign of any other infection.

C. M. W.

ARAGÃO (Henrique de Beaupaire). [In Portuguese & English.] Leishmaniose tegumentar e sua transmissão pelos phlebotomos. **Tegumentary Leishmaniosis and its Transmission by Phlebotomi.**--*Mem. Inst. Oswaldo Cruz.* 1927. Vol. 20. No. 2. In Portuguese pp. 177-186. With 2 figs. on 1 plate. In English pp. 187-195.

—. Transmissão da leishmaniose pelos phlebotomos.—*Folha Med.* 1928. Jan. 15. Vol. 9. No. 2. pp. 13-15.

The two papers cover the same ground and discuss the transmission problem of oriental sore in South America in the light of recent results. The experimental production of oriental sore on the nose of a dog by inoculation of crushed up *Phlebotomus intermedius* is again mentioned (see this *Bulletin*, Vol. 19, p. 316). The author mentions a certain district near Rio de Janeiro in which occurred about 50 cases of the disease after the introduction of a case from another locality. Sandflies abounded in this district and were undoubtedly responsible for the

epidemic, which subsided when the nature of the disease was recognized and the cases treated. The author believes that this outbreak demonstrates that there is no reservoir of the virus but man, and that sandflies of the genus *Phlebotomus* are the sole vectors of the disease.

C. M. W.

ABIMÉLECH (Robert). Un cas autochtone de leishmaniose cutanée à Constantinople.—[**Indigenous Case of Dermal Leishmaniasis at Constantinople.**—*Ann. Dermat. et Syph.* 1928. Mar. Ser. 6. Vol. 9. No. 3. pp. 168-174. With 5 text figs.]

Two women, cousins, returned to Constantinople after a stay in Ourfa where they contracted oriental sore. One of the women shared a room with her sister who had never been out of Constantinople and was frequently visited by the cousin, who stayed with her for several days. Some time after, the sister noted on the back of her right hand a tiny nodule, which developed into a typical oriental sore in which *Leishmania tropica* was demonstrated. This appears to be the first autochthonous case of the disease in Constantinople.

C. M. W.

BROSIOUS (O. T.) **Dermal Leishmaniasis—Case Report.**—*Sixteenth Ann. Rep. Med. Dept. United Fruit Company, Boston, Mass.* 1927. pp. 162-163. [United Fruit Co. Hosp., Almirante, Panama]

The patient had an indurated sore on the outer surface of the right arm and near it a papule which had appeared two months after the first lesion commenced. The first lesion began as a papule which appeared about a week after the patient had returned to Almirante from a 3-weeks' stay at Bocas del Toro, the seaport town distant about 14 miles from Almirante. Diagnosis was made by discovery of leishmania in scrapings of the lesion. Intravenous injections of 1 per cent. solution of tartar emetic were given on alternate days, commencing with 3 cc. and increasing by 1 cc. till 6 cc. were given on the 7th day. The last injection caused a spasmodic cough which was so severe that the patient became cyanosed and could scarcely breathe. The symptoms, however, quickly passed off. No further treatment was given. The small papule had disappeared by the 5th day and the sore had completely healed by the 10th day. There was thus a remarkably quick response under an unusually small dose of the drug.

C. M. W.

OWEN (D. Uvedale). **A Case of Oriental Sore of Seventeen Years' Duration.**—*Ann. Trop. Med. & Parasit.* 1928. June 12. Vol. 22. No. 1. pp. 43-46. With 2 figs. on 1 plate. [7 refs.]

The patient, an Englishman, contracted oriental sore in Lahore in 1910, when two small nodules appeared on the dorsal surface of the left hand and one on the right arm. By 1912 they had increased in size. The sore on the arm then healed after treatment with tincture of iodine, but those on the hand persisted and finally coalesced in spite of treatment by scraping and application of iodine. In 1926 leishmania were found in the lesion and treatment with intravenous and local tartar emetic was instituted without result. Treatment with stibosan and unfiltered X-rays again did not improve the condition, nor did a further three weeks' course of tartar emetic locally. Finally, after a further course of intravenous antimony in the form of stibosan had been given, healing commenced and was continued without interruption.

C. M. W.

JEANSELME, HUET (Léon) & HOROWITZ. Un cas de bouton d'Orient, accompagné de lymphangite scléreuse réticulée de l'avant-bras. [Examen anatomo-pathologique (docteur Ad. DUPONT).]—[**Case of Oriental Sore with Lymphangitis of the Fore Arm.**]—*Bull. Soc. Française Dermat. et Syph.* 1928. Mar. No. 3. pp. 221-225. With 2 figs.

A case of oriental sore of Syrian origin with contiguous lesions on the middle and ring fingers of the left hand, showed an oedema of the back of the hand and a diffuse lymphangitis of thickened lymphatics and nodules on the upper part of the forearm. Though leishmania were easily found in the lesions on the fingers, no parasites could be found in the nodules on the arm. The authors call attention to the frequency with which cases of oriental sore are complicated by lymphangitis, a fact which is insufficiently recognised.

C. M. W.

LÉPINE (Pierre) & HITTI (Y. K.). Le kala-azar en Syrie. [**Kala Azar in Syria.**]—*Jl. Méd. de Lyon.* 1927. Nov. 5. No. 188. pp. 565-588.

The paper describes the three cases of kala azar previously noted by the authors (see this *Bulletin*, Vol. 24, p. 148).

C. M. W.

ROSKIN (G.) & ROMANOWA (K.). Die Teilung des Kerns bei Leishmania tropica. [**Nuclear Division in *L. tropica*.**]—*Arb. a. d. Microbiol. Inst. d. Volksunterrichtskommissariats.* 1927. Vol. 3. German summary pp. 392-393. [In Russian pp. 181-189. With 4 figs. & 1 plate.]

A preliminary note on the subject of the paper in this *Bulletin*, Vol. 25, p. 429.

C. M. W.

BERIBERI.

VEDDER (Edward B.) & FELICIANO (R. T.).—**An Investigation to determine a Satisfactory Standard for Beriberi-preventing Rices.**—*Philippine Jl. Sci.* 1928. Apr. Vol. 35. No. 4. pp. 351–387. With 8 text figs. & 2 plates. [7 refs.]

Endemic beriberi cannot be eradicated without legislation and this in turn depends upon the determination of a satisfactory standard for beriberi-preventing rices. Such is the idea underlying the work carried out in the Philippine Islands.

The plan of the research was as follows:—200 samples of rice grown in different localities and of all degrees of milling were collected. These rices were then examined as to the percentage of external layers of the grain still adhering and were then submitted to chemical analysis and were fed to pigeons.

The authors used a simple method for the inspection of pericarp. One hundred grains of rice are stained with Gram's Iodine solution for one minute. The iodine having been rinsed off with water, each grain is examined and the amount of pericarp remaining expressed as a percentage.

Tables, photographs and details of the work are supplied and the following are some of the conclusions. The Gram's iodine method is simple and accurate. Rices examined in this way having 50 per cent. or more of the external layers adhering never produced polyneuritis in pigeons. Human beriberi can be prevented by selecting rice in this way and it is suggested that the test should be made during the process of milling. Thus highly milled rice has 0–20 per cent. of external layers, medium milled 31–49 per cent., and under milled 50–100 per cent.

Chemically, amido-nitrogen figures are useless as an index, 1.05 per cent. ash is a poor index, 0.62 per cent. phosphorus pentoxide is better and the best single index of all is 1.28 fat. The chemical index proposed for beriberi-preventing rice is "any rice having 1.77 per cent. of phosphorus pentoxide plus fat, but not less than 0.4 per cent. phosphorus pentoxide; or any rice having not less than 0.62 per cent. phosphorus pentoxide; or any rice having not less than 0.5 per cent. phosphorus pentoxide and with at least 75 per cent. of the external layers of the grain thus remaining."

No rice of this chemical grade produced polyneuritis in pigeons. Thorough washing of rice reduces the phosphorus content and presumably the vitamin content also. The depredations of insects, which eat the external layers of the grain, account for the vitamin loss in stored, under-milled rice.

A. D. Bigland.

MCCARRISON (R.). **The Influence of Irrigation on the Nutritive Value of Rice.**—*Indian Jl. Med. Res.* 1928. Apr. Vol. 15. No. 4. pp. 915–920. [5 refs.] [Summary appears also in *Bulletin of Hygiene.*]

One of the outstanding features in the distribution of beriberi in the Madras Presidency is the prevalence of the disease in the low-lying, irrigated tracts of the North-East Coast and its rarity in the hot and

humid regions of the West Coast. Rice is the staple article of diet in both localities, but in the East Coast district it is grown under wet conditions (a layer of irrigation water lying in the fields from sowing until harvest) whilst in the West Coast district much of the rice is grown under dry conditions above the limit of irrigation. Samples of the same type of rice grown under wet and dry conditions were chemically analysed and no fundamental difference found. Rats were fed on the two types of rice in addition to a basal diet which was deficient in, but not devoid of, vitamins A and B. Growth was definitely superior in the group receiving the dry-crop-rice (35 and 24 per cent. better in two experiments). The author considers that the cause of the inferior nutritive power of the wet-crop-rice is the influence of irrigation. The nature of the soil on which the two samples of rice were grown varied (the wet crop on a deep, loamy clay; the dry crop on a red, slight gravelly loam), but this is not considered to account for the difference. It is concluded that the conditions of cultivation of rice, especially in regard to water supply, is an important factor in determining the endemicity of beriberi.

H. N. H. Green.

SATOV (T.). La prévention du béribéri. [**The Prevention of Beriberi.**] *Bull. Office Internat. d'Hyg. Publique.* 1928. May. Vol. 20. No. 5. pp. 729-734.

Probably beriberi made its first appearance in Japan during the years 1186 to 1333. Since then it would seem that the disease has fluctuated considerably. The period 1688 to 1735 showed a recrudescence, which was followed by an interval of freedom. In 1801 to 1817 its reappearance was noted. About 1873 (or 1874) in one detachment of the Japanese army, one man in every three suffered from beriberi. So alarming was the incidence that the Emperor Meiji caused a special hospital to be founded. This was abolished in 1882 and was replaced by a special department at the Imperial University. In 1918 a committee for the study of beriberi was inaugurated, which carried on investigations till 1924.

During the decade 1912-1922 there was a marked increase in the beriberi death rate. The figures were always considerably higher in males than females and among dwellers in towns of 50,000 or more inhabitants. The army and navy show a similar recrudescence of the disease during the last few years.

In Japan diet alterations play a very important part in the prevention of beriberi and tables are given in proof of this statement. In 1891 the diet of the army was modified by issuing a mixture of rice and barley. This caused a notable decrease in the disease, although there were still periods of recrudescence. Latterly vitamin B products have been added to the rice-barley regime, with very satisfactory results. Similar results have been obtained in the navy. In 1883 the diet was altered and in 1886 the rice-barley regime was begun. In 1878-1883 there were 230-390 cases of beriberi per thousand sailors. In 1884 127.4 per thousand; in 1885-1886 the figure fell to 5.9 and later to 0.4. Since then the incidence has varied between 0.1 and 1.0 per thousand with a slight increase in 1919.

Prison records show analogous results.

A. D. B.

GREY (Egerton Charles). **The Pre-Beriberi Condition. With Special Reference to its Existence in Japan.**—*Jl. of Hyg.* 1928. Mar. Vol. 27. No. 3. pp. 257-267. With 3 plates. [26 refs.] [Biochem. Inst., Cambridge.]

There are a priori grounds for supposing that a pre-beriberi condition exists. The cause of deficiency disease is multiple, not single as it is with a specific infection and, therefore, we "shall expect to find leading up to the condition of obvious deficiency of a certain factor, other conditions due to the absence of one or more associated factors; in other words we might anticipate a preliminary condition leading to the deficiency disease in its characteristic form."

It is important to remember that in the prevention of deficiency disease, two conditions are essential—"the accessory factor and the factor to which it is accessory." Thus, though an adequate supply of vitamin B may hide the ill effects of an unbalanced diet, there must be an underlying weakness in the organism and this may suddenly become manifest when the vitamin is withheld. Such an underlying weakness might be expected to develop into true beriberi without any diet change merely as the result of adverse conditions, such as excessive heat or humidity, lack of exercise, fatigue or superadded intoxication of any kind.

In Japan during the months July, August and September, this state of general malnutrition passes abruptly into beriberi. It is said that the disease has begun, but it is truer to say that what was hidden has now become obvious and that for all those attacked there is a still larger number in the preliminary condition.

Evidence for such a pre-beriberi condition was looked for in two situations (a) *The Central Telephone Exchange, Tokyo*. This was visited by the author in June, 1927. The conditions were found to be very good and yet of the 500 women employed, 80 were incapacitated from work by a condition which was "either diagnosed or about to be diagnosed as beriberi." The women showed a state of exhaustion with anaemia, dyspnoea on exertion, enlarged heart and a rapid and irregular pulse. These cases were diagnosed as beriberi by the authorities, but the author suggests that a better explanation would be "the exacerbation of the condition of pre-beriberi which already existed."

(b) *The Army*. In 1923 out of 207,939 patients (recruits) 82,429 fell sick with nutritional disorders, and out of a death roll of 278 forty were due to this cause. It is to be remembered that these men had been medically examined when they entered the army and therefore may be supposed to have been reasonably fit. A similar state of affairs was found among soldiers in their second two years of training. The author is of the opinion that these facts show the presence of a pre-beriberi condition.

75 per cent. of Japanese are mouth breathers and this is probably associated with under-nourishment and leads to chronic respiratory troubles. Imperfect eyesight, a common finding, is also ascribed to poor feeding. The fact that the Japanese prefer to sit at work is taken as evidence of weakness, as is also the common custom of men and women to fall asleep in public conveyances.

It is suggested that these observations supply indirect evidence of the presence of a pre-beriberi condition.

The etiology is ascribed to "a prolonged use of a diet deficient in essential factors, as well as accessory factors, and in particular one too low in protein and too high in starch, though there is sufficient vitamin B complex to prevent, under ordinary circumstances, the appearance of beriberi." It follows that prophylactic treatment is most important, since the condition is slowly acquired and difficult to cure. Improved diet with the addition of milk, eggs and meat is advised. The gradual introduction of a staple food richer than rice in protein should do much to combat the general malnutrition.

[The incidence of sickness in the Japanese Army as shown by the figures in this paper is so extraordinary that one wonders whether some error has not crept into the statistics. According to this account, the number of conscripts recruited in 1923 was about 300,000, of which 207,939 became patients!]

A. D. B.

TAYLOR (J.), MARTIN (C. de C.) & THANT (U.).—**Preliminary Enquiry into Beri-Beri in Burma.**—*Indian Jl. Med. Res. Memoirs. Supplementary Series to Indian Jl. Med. Res.* 1928. Mar. Memoir No. 8. 104 pp. With 3 maps. [Pasteur Inst., Burma.]

The incidence of beriberi in Burma is difficult to assess, as the statistics are incomplete. Useful figures, however, were obtained from hospitals. In the years 1923 and 1924, out of 200 hospitals and dispensaries 78 returned a list of cases. In 1923 figures from these sources showed a total of 239 in-patients and 197 out-patients, and in 1924, 381 in-patients and 303 out-patients. The towns from which these figures were collected do not represent average Burma conditions either in mode of life or in the nature of the population. It may be said, however, that there is a regular annual incidence of beriberi in the larger coastal towns mainly affecting temporary Hindu immigrants from India. In the large agricultural areas the disease is relatively rare.

In special communities such as timber camps, police posts, schools, jails, lighthouses, lightships, etc., epidemics occur. The disease is found regularly in certain outlying areas of the Province, as, for example, in the Upper Chindwin.

Dietary tables are supplied showing the variety and quantity of food taken by Rangoon residents, Burmans, Mohammedans and both meat-eating and vegetarian Hindus. It was found that the average Burman has a varied and generous dietary, and this, no doubt, accounts for the relative infrequency of beriberi. Important also in this respect is the fact that rice in the villages is hand-pounded and in the towns under-milled. The Mohammedans have a similar diet to the Burmese, but slightly less in quantity of accessory food stuffs. Among the vegetarian Hindu atta as well as milk and milk products are taken in addition to rice. Atta is of value in compensating for any vitamin deficiency of the rice. The meat-eating Hindus have very varied diet habits and their food is inferior to that of the Burmese and sometimes badly balanced. The Hindu coolies frequently consume 2½ pounds of rice daily with hardly any supplementary articles of food. This doubtless accounts for the relatively heavy incidence of beriberi among this class of the population.

In Burma beriberi has a seasonal prevalence beginning about two months after the monsoon is established, reaching its height about

October and diminishing during the cold weather. The deterioration of rice stored in the husked state under damp conditions and the taking of a diet consisting mainly of rice with a minimum of accessory food stuffs are the two chief aetiological factors of the disease in Burma.

A. D. B.

MARANHÃO (J. Leite). Beriberi no collegio militar do Ceara. [**Beriberi in the Military College, Ceará.**—*Brasil-Medico*. 1928. Apr. 7. Vol. 42. No. 14. pp. 374-377.]

In the military college there resided 500 students, which number could be increased to 750. On July 5th, 1927, a case of polyneuritis appeared suddenly and within the next ten days 83 individuals were attacked. The symptoms were typical of beriberi of an average degree of severity. The general hygienic conditions were good, the food excellent in quality, and sufficiently varied. The students first attacked had recently come from Piahy, Maranhão, and the Amazonas districts where beriberi is endemic. The explanation given is that there were one or more carriers of the *Bacillus asthenogenes*, the organism isolated from cases of beriberi in Cochin China.

The outbreak was arrested by removal and isolation of the patients, the healthy contacts also being transferred elsewhere, while the buildings were thoroughly disinfected. One of the students who went to the neighbouring town of Maranguape developed symptoms 20 days after leaving the college, and two others out of four who went to Baturité were also attacked. [It is a matter for regret that it was not found possible to carry out experimental work with the material afforded by the outbreak here recorded.]

H. Harold Scott.

SCOTT (Leonard C.) & HERRMANN (George R.). **Beriberi ("Maladie des Jambes") in Louisiana, with Special Reference to Cardiac Manifestations.**—*Jl. Amer. Med. Assoc.* 1928. June 30. Vol. 90. No. 26. pp. 2083-2090. [16 refs.] [Louisiana State Board of Health, the New Orleans Charity Hosp. Heart Station, & Tulane Univ. of Louisiana School of Med., New Orleans.]

The authors draw attention to the occurrence of beriberi in the rice-producing parishes of Louisiana. A disease known locally as "maladie des jambes" has prevailed in the rice belt for many years. The majority of the cases occur in the autumn, during which time the people live on an exclusive diet of polished rice. In the winter months meat, potatoes and bread are added to this diet and it is stated that no new cases occur during this season of the year. The authors think it probable that other factors contribute to the incidence of the disease which in 1921 and 1923 assumed an epidemic character. Failure of the crop and the consequent consumption of large quantities of spoiled or mouldy rice may have been responsible for the 1921 outbreak. It is pointed out that the rice workers live in insanitary houses and have to work for many hours in cold and muddy water.

The onset of the disease is insidious, slowly progressing, and if no change is made in the diet the patient dies of heart failure or some

intercurrent infection. If foods containing vitamin B are given, slow recovery takes place.

'Maladie des jambes' is characterized by three groups of symptoms: (1) Cardiac manifestations, palpitation, tachycardia, oedema and dyspnoea. (2) Neurotic phenomena—weakness of the legs, pain in the calf muscles, and paraesthesiae. (3) Occasionally slight gastro-intestinal symptoms, but all cases complained of pain on pressure over the epigastrium. The authors have come to the conclusion that 'maladie des jambes' is identical with beriberi.

An outbreak of disease in the Parish Prison in 1927 is referred to, but as particulars of the diets were obtained from the prisoners themselves and the authors do not appear to be certain that the condition was beriberi at all, no further mention of this need be made.

A. D. B.

BANERJI (R. N.). **An Outbreak of the Epidemic Dropsy Type of Beriberi in Allahabad, 1927.**—*Indian Med. Gaz.* 1928. Apr. Vol. 63. No. 4. pp. 190–192. With 1 plan.

The epidemic here described started in Allahabad about the middle of January, 1927, reaching a maximum in February and March and gradually disappearing by the end of April. 100 Bengalee families out of a total of 500 families were attacked, nearly 200 cases in all. The sufferers were almost all Bengalese, the age incidence was between four and sixty years, the ratio of females to males was 3 to 1 and breast-fed babies escaped entirely.

Clinically the findings were as follows:—onset with gastro-intestinal symptoms; remittent or intermittent fever of moderate severity; oedema, mostly of legs and feet; no true neuritis; some cardiac signs, such as dyspnoea. The average duration was about six weeks and there were only a few deaths, all among females.

It is remarkable that the outbreak was practically confined to the Bengalese, and the cause of the condition, therefore, is to be sought in factors relating to this class of the community in particular. Their diet consists of rice, fish and vegetables, cooked in mustard oil, fresh fruits, etc. Apparently the rice was not clearly to blame, though it was imported and some of the shops where it was sold were insanitary. Again, several members of a family were affected one after another, even when rice had been prohibited, and three families were attacked which had stopped taking rice a month before they began the disease. The mustard oil was bazaar-made and was found to be adulterated. This was a possible cause of the outbreak, since those who used pure mustard oil escaped, while in five families the stopping of mustard oil, rice being continued, led to recovery.

The author does not wish definitely to implicate any particular factor as the cause of the outbreak, but he is certain that neither epidemic dropsy nor beriberi is due to avitaminosis. The disease is not transmissible from person to person. It is thought that races like the Bengalese, who are accustomed to carbohydrate excess for generations, are more likely to fall victims to the disease. In this connexion it is interesting to note that the up-country Muhammadans, who take very little carbohydrate, escape entirely.

A. D. B.

ALBERT (Jose) & OCAMPO (Albino N.). **Is Infantile Beriberi disappearing? Facts on Infantile Beriberi during the Last Thirteen Years.**—*Jl. Philippine Islands Med. Assoc.* 1928. May. Vol. 8. No. 5. pp. 221–225. [College of Med., Univ. of the Philippines.]

This work is based upon 422 cases of infantile beriberi admitted to the Department of Pediatrics of the Philippine General Hospital, Manila, during the years 1915–1927.

The following facts were elicited:—Sex has no influence in the condition, the proportion being 1.15 to 1 in favour of males. There are three types of the disease. 1. The *cardialgic type* in which evidence of precordial pain, circulatory failure, cyanosis of the extremities and lips is noted. 2. The *aphonic type* characterized by aphonia with catarrh of the upper respiratory tract. 3. The *pseudo-meningitic type* in which ptosis, with or without staring of the eyes, choreic movements of the hands, restlessness and even convulsions occur. The first and second type are almost always found in infants of one to three months and the third type is noted after the third month and nearly always between six and nine months. The first two types predominate.

Infantile beriberi is certainly decreasing in Manila. In 1915 the figure was 7.79 per cent. of admissions, while in 1927 it had fallen to 0.45 per cent. The deaths have fallen from 739 cases in 1923 to 262 in 1927 (up to November). These good results are due to the efforts of the Public Health Service and to the appropriation of funds for supplying "tikitiki" on a large scale to the poor.

A. D. B.

BRAY (George W.). **Vitamin-B Deficiency in Infants: its Possibility, Prevalence and Prophylaxis.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1928. June 30. Vol. 22. No. 1. pp. 9–36. With 9 text figs., 1 map & 2 plates. [Summary appears also in *Bulletin of Hygiene.*]

The author has shown in a very decided manner that a large part of the infantile mortality in the island of Nauru (a mandated territory in the Pacific) is due to a vitamin B deficiency. This mortality is high and the deaths are classed under many different headings owing to the variety and rapidity of the symptoms. The introduction of European foods, together with the abolition of the use of fermented "toddy" (the sweet sap of a coco-nut spathe), led to this vitamin lack. The age incidence of this deficiency disease is practically confined to the 3rd month; the duration is from 5 min. to 12 hr. from onset to death. If the infant is saturated with vitamin B (in the form of marmite, rice polishings, "toddy," "lactogen," etc.) the child recovers in a few hours. Acute and chronic cases occur which are always seen in breast-fed infants and an insidious type in older artificially fed babies. In the acute cases there are three well-defined phases: (1) gastro-enteritic, (2) pneumonic, (3) meningismic. The insidious form is characterized by a marked lowering of resistance to infection. Analyses of the mother's milk showed, amongst other deficiencies, a low fat content, though a large amount of fat was consumed in the form of coconut. If the mother's diet were supplemented by a source of vitamin B the fat content of the milk rose enormously. Prophylaxis consisted of the administration of an emulsion of the yeast from "toddy" (a very potent source of vitamin B) and an equal amount of cod-liver oil, to all mothers and children, who were compelled to attend weekly at the clinics. At the same time large quantities of fresh "toddy" were

given to both mother and child. The effect was remarkable, with a large drop in infantile mortality, a great increase in the average gain in weight, and a large decline in infantile hospital admissions, for it is very rare for a baby receiving the emulsion to develop any infective process. Cases which had previously not done well on cod-liver oil alone improved greatly when the "toddy" yeast was added. It is suggested that vitamins A and B have a synergic action, so that one should look for a vitamin B deficiency when administration of A is not having any marked effect. Marasmus, for instance, in the author's experience, always responds to the administration of both factors. The clinical findings also made it clear that a B-factor deficiency does occur in human milk, even without the mother showing any deficiency symptoms.

H. N. H. Green.

MEBIUS (J.). Oedeemtheorie de beri-beri. [**The Oedema Theory of Beriberi.**]—*Nederl. Tijdschr. v. Geneesk.* 1928. Aug. 18. 72nd Year. 2nd Half. No. 33. pp. 3985-3997. [Refs. in footnotes.]

Mebius quotes the post-mortem reports of three male sufferers from beriberi, paying special attention to the condition of the heart and giving details of the microscopical examination of this organ. Fatty degeneration of the heart muscle, if present at all, is never marked and cannot account for the cardiac failure. The slight intercellular oedema, found in the right heart, but absent in the left, is caused neither by inflammation nor back pressure, nor is it of renal or cachectic origin. It is to be considered as a symptom of the avitaminosis as such. More marked yet is the intracellular oedema of the muscle fibres, which is apparent from the unusually distinct longitudinal striation, whilst the transversal striation becomes very indistinct. This serous imbibition of the muscular tissue is the cause of the failure of the beriberi heart (see AALSMEER and WENKEBACH, below). It is not necessary to consider this condition as a sequel of a primary lesion of the heart nerves: (1) There is no anatomico-pathological proof for such a sequence, (2) the motor nerves have seldom been found affected, (3) the neuritis of vasomotor nerves as the cause of oedema is only hypothetical, (4) the fairly constant tenderness of the muscles without tenderness of the nerve trunks, is against the existence of neuritis and (5) so is the irregular and varying character of the hypaesthesia, which very seldom increases to anaesthesia.

The blood in beriberi is less coagulable than normal; the subcutaneous and subperitoneal oedema, as well as the oedema of the muscles is in discordancy with the moderate oedema of liver, spleen and kidneys. The different contractility of the capillaries of various organs can explain this, according to the author. Avitaminosis in beriberi causes a general alteration of the colloidal condition of all contractile tissues.

Finally the author puts the question, whether this theory accounts for the symptoms in beriberi and gives an affirmative answer to this question, considering respectively heart failure, muscular weakness, paralysis of the diaphragm, constipation, oedema, ascites, hydrothorax, hydropericardium.

The sensory disturbances may be caused by the oedematous alteration of the skin, involving also the tactile terminal organs of the nerves; the low tendon reflexes are caused more by the impossibility

of contraction of the muscles than by actual neuritis, whilst the tenderness of the muscles is not in contradiction with the still intact condition of the sensory nerves of the muscular tissue.

W. J. Bais.

AALSMEER (W. C.) & WENCKEBACH (K. F.). Het beri-beri-hart. I. Clinisch Gedeelte. II. Proeve eener verklaring der ziekteverschijnselen aan hart en bloedsomloop van beri-berilijders. [**The Beriberi Heart. Clinical Account.**]—*Nederl. Tijdschr. v. Geneesk.* 1928. May 12. 72nd Year. 1st Half. No. 19. pp. 2340-2371. With 7 figs. on 1 plate. [7 refs.] [Netherlands-Indies Med. School, Soerabaya.]

The first of these articles is more especially written by Aalsmeer. The heart symptoms in beriberi are generally put down to vagus degeneration. Yet, though such degeneration may occur in beriberi, the absence in this disease of arrhythmia, so common a sequel of vagus lesion, made others ascribe the heart symptoms to a direct noxious influence of beriberi on the heart muscles. In discordance with a myocardial affection, however, is the preponderance of the hypertrophy on the right half of the heart. It becomes more and more probable that the whole of the circulatory system is affected in beriberi.

The beriberi heart is an "irritable heart", but at the same time often shows signs of cardiac weakness (back pressure, dyspnoea). The vessel wall is hypotonic, which is shown by the lowered diastolic blood pressure. The combination of symptoms has some likeness with sympathicotony, but in convalescence vagotony may occur. These facts do not lead to a well-defined conception of the pathogeny of the beriberi heart.

The author gives an elaborate and interesting account of his observations. In the lightest cases the heart symptoms remain slight or even unnoticed, because the disturbance of the motor and sensory nerves urges the patient to take rest. Yet in such cases they are never missing and become more marked after slight exercise. The heart region shows a sort of waving pulsation, which the author calls "turbulence." Sometimes there is a slight enlargement to the right and the heart sounds are louder than usual, but there are no murmurs. In more serious cases the patients complain of a sensation of heaviness or even pain in the liver region, the "turbulence" of the heart is more pronounced, but there is no distinct apex beat. The heart is now enlarged to the right, but also slightly to the left. Systolic murmurs may be heard. The electrocardiogram is normal. The lungs are never affected to any extent, which is in striking contrast with what we usually see in cardiac patients. The radiographic examination neither shows the intensified shadows in the lower parts of the lungs nor round the hilus so commonly seen in other types of cardiac incompetence, but invariably enlargement of the liver is seen. The most serious (acute, pernicious) type of beriberi ("Shoshin" of the Japanese), dramatically pictured by various authors, e.g. by MANSON, is not accompanied by pulmonary oedema. The peripheral circulation fails, the heart is much enlarged and so is the liver, as a symptom of important back pressure. A venesection may bring much comfort to the patient in this serious and often fatal condition.

Anatomo-pathological examination shows a dilatation of the heart and a thickening of the muscular wall of both ventricles, without any peculiar finding in the microscopical picture.

As regards the treatment, cardiac tonics and diuretics have no effect at all, whilst the administration of vitamin B, apart from its anti-neuritic action, has a striking diuretic effect in the hydropic beriberi patient.

Taking all these facts into the account, in the clinical picture of beriberi the failure of the right heart predominates, whilst no reason therefor can be found in the pulmonary circulation.

W. J. Bais.

WENCKEBACH (K. F.). **St. Cyres Lecture on Heart and Circulation in a Tropical Avitaminosis (Beri-Beri).**—*Lancet*. 1928. Aug. 11. pp. 265–268. [3 refs.] [First Med. Clinic, Vienna.]

The lecturer recounts how forty years ago he was intimately acquainted with PEKELHARING and WINKLER, who had studied beriberi in the Dutch Indies. Many of the findings aroused his interest so much that seven years ago he succeeded in persuading Dr. AALSMEER, working in Java, to undertake a research upon the disease, more especially in its cardiac aspects. The present lecture is based upon the findings thus obtained.

Proof of the vitamin B pathogenesis of the disease is furnished by the fact that beriberi occurs where polished rice is the exclusive diet and by the fact that the sole effective treatment is the addition of rice bran, rice extracts, or the bean *Phaseolus radiatus* to the diet.

The following cardiac manifestations are noted :—

1. From the beginning the right heart is enlarged as are also the left auricle and ventricle. This was confirmed radiologically.

2. There is a rapid increase in the size of the heart with cardiac failure, chiefly involving the right side. A curious " wriggling, fluttering " apex is evidence of this.

3. Increasing stasis in the liver and venae cavae with hepatic enlargement, ascites and even sudden death.

4. There is never any clinical or electrocardiographic evidence of cardiac irregularity. The E.C.G. may show right ventricle preponderance.

5. The pulmonary circulation shows no stasis.

6. All the usual cardiac tonics are of no avail in treating the beriberi heart, vitamin B being the only remedy.

7. At autopsy there are no inflammatory changes in the cardiac muscle.

As regards the cardiac physics of the condition, the following arguments are brought forward. If the two ventricles show an increasing and equal failure in systolic contraction, both will be unable to empty themselves completely at each systole and the residual blood added to the amount arriving for the next systole will soon bring about cardiac failure. Two factors, however, establish a difference between the right and left side of the heart. Firstly, the right side has a weaker musculature and the tricuspid valves, having no adequate fibrous support, are very liable to become incompetent. Secondly, since the right heart receives all the blood from the periphery and since the left heart can only receive that blood sent to it by the right heart, it follows that the more engorged and ineffective the right side becomes the safer becomes the left. These contentions, in the author's opinion, account for the rapidly increasing failure of the right heart in acute beriberi, with visceral engorgement, while just up to the last few moments before death the lungs are free, the left ventricle poorly filled and the pulse

small and rapid. The following law is formulated, "in equal and increasing feebleness of the whole heart muscle the patient suffers most and dies from the failure of the right side of the heart only."

An attempt is made to explain the cardiac enlargement met with in beriberi. The vagal factor is discussed and found unacceptable. Hypertrophy cannot account for the increase in size and weight of the organ since there is no reason why this should occur according to the arguments already given. The explanation favoured is that of a water retention with consequent swelling of the cardiac muscle fibres. The following facts are brought forward in support of this hypothesis. (1) TIEMANN has shown that striated muscle, in contrast with the smooth variety, swells in water. This is true of heart muscle but to a less extent. In beriberi a pseudo-hypertrophic-like swelling of the muscles has been noted in the preoedematous stage. The giving of vitamin B causes these enlargements of the calf muscles to "melt away as snow in the sun" and at the same time the heart rapidly becomes normal in size and in contractility. (2) This marked improvement is accompanied by a great increase in urine output. (3) Experiments show that the muscles are one of the biggest water reservoirs in the body. (4) The E.C.G. in the beriberi heart shows an increased conductivity which becomes more marked as cardiac failure advances. A similar phenomenon was found experimentally in the water swollen heart.

It is suggested that water retention may be the cause of other beriberi signs such as swelling of the motor and sensory nerve endings, anasarca, swelling of the parotids and of the mucous membrane of the gall bladder. Other diseases may show a similar condition as in the water retention of myxoedema.

Heart "hormones" and "automatins" are considered and it is suggested that vitamin B, in its chemically pure state possibly identical with histamin, may belong to this group of substances. There is a possibility that other chemical agents will be found to stimulate the heart even when a systole has already occurred, for "the beriberi heart shows that not every heart that stops its systolic action has lost its regular automatic vital function."

A. D. B.

SUTHERLAND (G. A.). **The Heart and Circulation in Beri-Beri.** [Correspondence.]—*Lancet*. 1928. Aug. 18. pp. 358–359.

The writer of this letter takes exception to Professor WENCKEBACH's views (see above) regarding cardiac physics. The great function of the right ventricle is to carry on the pulmonary circulation. In beriberi there is no pulmonary stasis and therefore the right heart should be regarded as working efficiently. How can such a well acting right heart be responsible for the visceral engorgement? In the commonly accepted view this engorgement is due to a failure of the "forward pressure" of the left ventricle and indeed all the cardiac signs in beriberi are due to left ventricle weakness, the right side only beginning to fail at the very end as evidenced by the onset of pulmonary stasis.

Professor WENCKEBACH's explanations are characterized as an example of the "back pressure theory in all its nakedness." The need for physiological experiments to show the correlation between the two sides of the heart, after the manner of HARVEY, is suggested.

A. D. B.

STEPHENS (G. Arbour). **The Heart and Circulation in Beri-Beri.** [Correspondence.]—*Lancet.* 1928. Sept. 1. p. 478.

A communication regarding Professor WENCKEBACH's paper, it deals more especially with Dr. SUTHERLAND's letter (above). Reference is made to a paper by the writer in the *Dublin Journal of Medical Science* in October, 1916, in which he suggested that a negative pericardial pressure exists in healthy subjects and that this disappears in disease, especially when serous effusions are present. This negative pressure keeps the pericardial fluid at a uniform thickness all over the cardiac surface and its removal affects the weaker walled right ventricle sooner than the left. These findings are expressed in a mathematical formula which the writer suggests may possibly be of help to Professor WENCKEBACH in his law of circulatory correlation between the right and left heart.

A. D. B.

ACOSTA-SISON (H.). **Neuritis in Filipino Parturients.**—*Jl. Philippine Islands Med. Assoc.* 1928. May. Vol. 8. No. 5. pp. 230-234. With 3 charts in text. [College of Med., Univ. of the Philippines.]

Neuritic symptoms are very common among Filipino parturients. Local physicians hold the opinion that the condition is beriberi and that babies of mothers so affected, especially when breast-fed, invariably succumb to infantile beriberi.

The condition is characterized by various paraesthesiae, present usually in the legs, sometimes in the arms and rarely over the whole body. Oedema may or may not be present. The last two months of pregnancy is the most usual time for the occurrence of the malady and in mild cases symptoms disappear almost immediately after parturition. In more severe cases the numbness and weakness of the extremities do not disappear until two to three months after parturition. In the extreme grade of the disease, *i.e.* those showing muscular wasting and foot drop, recovery takes five months or more.

Three hundred and twenty-seven cases of "numbness" were analysed as regards aetiology. Seven only showed heart affections. A long list of associated and possibly causal conditions is given. Apparently out of nine very severe cases, eight showed one of the following complications—dysentery, typhoid, post-partum haemorrhage, puerperal infection, pernicious vomiting of pregnancy.

As regards diet no differences were found between the food of sufferers and non-sufferers. Semi-polished rice, fish and vegetables form the main part of the diet. Meat was consumed liberally by some and sparingly by others. Milk and eggs were not taken freely.

The author is inclined to the view that the condition is a toxæmia of pregnancy. True beriberi cases as seen in the Philippine General Hospital tend to be immune after one attack, but in the malady under discussion the symptoms tend to recur in successive pregnancies. In this connexion, too, it is interesting to note that, like eclampsia, the neuritis is by far the most frequent in primiparae. The possibility of pressure on pelvic nerves is mentioned as a possible causal factor.

The relation between infant mortality and neuritis in the mother is discussed. In 1917, of 137 babies whose mothers had no neuritic systems, 32 per cent. died within one year. In 1924 out of 189 babies

the figure was 31 per cent. These findings are to be contrasted with the following :—In 1917, out of 251 breast-fed babies of neuritic mothers, 49 per cent. died in the first year, and in 1924, out of 243, the mortality was 36 per cent.

The author points out that breast-fed babies of healthy mothers die of beriberi, and conversely mothers who have beriberi, even without treatment, may rear healthy children. He agrees that beriberi does exist both in mothers and babies, but to say that all neuritic symptoms among parturients are of beriberic origin is "far from true."

A. D. B.

JANTZEN (Walter). **Beri-Beri-like Polyneuritis—Case Reports.**—*Sixteenth Ann. Rep. Med. Dept. United Fruit Company, Boston, Mass.* 1927. pp. 172–176. [Truxillo Railroad Co. Hosp., Puerto Castilla, Honduras.]

Five cases of polyneuritis occurring at Truxillo Railway Company Hospital, Honduras, are described in detail. The condition is rare in this particular locality, these being probably the only cases recorded since the opening of the hospital nine years ago.

Of the five cases, four were males and one female; four were natives of Honduras and one a Jamaican negro. Only one case ended fatally. The signs were those of a peripheral neuritis, most marked in the legs, with absent or diminished deep reflexes and normal organic reflexes. Two of the cases showed involvement of the upper limbs and in these the fifth and seventh cranial nerves were also affected. The vagus and phrenic nerves were involved in two cases. Cardiac dilatation was encountered twice and in the one fatal case, in addition to the dilatation, hydropericardium was found at autopsy. There was no oedema in any of the cases. The spinal fluid was negative in all and no gross lesion in the nervous system was found at the one autopsy.

The possibility of beriberi is discussed. Against this diagnosis are the facts that the cases came from various farms fairly widely separated and that the diet contained articles rich in vitamin B. There were none of the signs associated with such poisons as arsenic, lead or alcohol. Had the cause been an infection more cases would have been expected. It is suggested that the condition might possibly be that known as acute febrile polyneuritis.

A. D. B.

OSHIRO (M.) & YUSHYO-KEI. **On Complications in Beri-Beri Cases.**—*Taiwan Igakkai Zasshi (Jl. Med. Assoc. Formosa).* 1928. June. No. 279. English summary p. 44. [In Japanese.] [Govt. Hosp., Karenko, Formosa.]

A study was made of the complications occurring in beriberi cases admitted to the Government Hospital at Karenko, Formosa, during the year 1927. Malaria, hookworm disease and ascariasis were found in almost all of the cases and it is suggested that they may play a part in the etiology of the disease.

Other complications noted were "gastritis, tuberculosis, pleuritis, typhoid fever, pyelitis, bronchitis, hyperacidity, syphilis, asthma, neuralgia."

A. D. B.

DE VOGEL (W.). Préparations anti-béribériques de vitamine. [**Anti-Beriberi Vitamin Preparations.**—*Bull. Office Internat. d' Hyg. Publique.* 1928. May. Vol. 20. No. 5. pp. 735-737.]

The Laboratory of Public Health, Dutch Indies, has placed before the public four preparations for the prevention and cure of beriberi.

1. *Tablets of anti-beriberi vitamin.* These consist of kaolin, which has absorbed the vitamin contained in rice husk. One tablet (0.250 gm.) contains the vitamin extracted from 7.5 gm. of rice husk. One to three tablets per diem are sufficient to protect against beriberi in an adult who eats completely decorticated rice. When accessory articles of diet are taken 1, 2 or 3 tablets should be given according to the nature of the accessory foods. For cases already showing signs of the disease 8-12 tablets per diem are necessary, especially at the beginning.

2. *Extract of anti-beriberi vitamin.* A liquid obtained by the extraction of activated "acid clay" is concentrated so that 0.1 cc. contains the vitamin of 15 gm. of rice husk (0.1 cc. equals two tablets). A daily dose of about 1-10 cc. will be sufficient for a adult living on polished rice.

Diluted with water this extract can be mixed with cooked rice, or it can be added to the water in which the rice is to be cooked. The extract itself is stable, but when diluted with water it should be used immediately. If for any reason a watery solution is desired to be kept, the extract may be diluted with a solution of 250 milligrammes of benzoic acid in a litre of water.

3. *Anti-beriberi vitamin powder.* This is made from the same substance as the tablets. It can be mixed with the rice before or after cooking, without altering the taste.

4. *Ampoules (2 cc.)* Each ampoule contains 1 mgm. of vitamin, the daily dose of an adult, mixed with 3 mgm. of harmless material and normal saline. The injection method (apparently subcutaneous or intravenous) is to be used in acute cases.

For the use of the Public Health Service these preparations are distributed free of cost. One of the first two preparations will be placed in the hands of an industrial concern.

A. D. B.

WOOLLARD (H. H.). **The Nature of the Structural Changes in Nerve Endings in Starvation and in Beri-Beri.**—*Jl. of Anatomy.* 1927. Apr. Vol. 61. Pt. 3. pp. 283-297. With 10 text figs. [10 refs.] [Univ. College, London.]

Most observers are of the opinion that inanition alone does not produce beriberi. In birds this may not be the case, as similar changes in the nervous system have been stated to occur in both conditions. As regards the neuro-pathological findings in these conditions, no uniformity is met with, some workers finding a general involvement of the nervous system, others a lesion in the anterior cornual cells of the cord and others again a peripheral neuritis. The object of this work is to determine, if possible, the point at which degeneration in the nervous system begins.

Rats were used throughout the experiments. Three series of animals were employed. 1. Those which had been fed on a deficiency diet and had developed beriberi. The diet consisted of:—caseinogen

20 parts, rice starch 65 parts, salt mixture 5 parts, cod liver oil 2 parts, hardened oil 10 parts. 2. Those deprived of all food for 4-7 days, but allowed to drink at will. 3. Similar to the second group, but here the animals had been allowed to nibble yeast extract at will.

As regards the beriberi animals, careful investigations revealed no changes in the cord, brain, nerve trunks or sympathetic nervous system. The intermuscular medullated sensory and motor nerves and their endings when stained with gold, silver and methylene blue methods, revealed definite morbid changes. In some cases the nerve endings had disappeared, but more usually they were swollen and showed loss of finer differentiation. The myelin suffered more than the axis cylinder and the changes were more marked near the ending of the nerve, becoming rapidly less as it leaves the muscle.

Rats taking no food showed similar changes in the nerve endings, but to a less degree. The animals allowed to nibble yeast extract presented the same lesion but possibly to a slighter extent than in the former group.

Both the deficiency fed and the starved animals revealed an abundance of chromaffin substance in the suprarenals and the cortex of these organs was unaffected.

A. D. B.

TRABAUD. Le test d'Aldrich et de MacClure dans le bérubéri. [**The Test of Aldrich and MacClure in Beriberi.**]—*Rev. Méd. et Hyg. Trop.* 1928. May-June. Vol. 20. No. 3. pp. 80-82.

The Aldrich and MacClure test which has been studied in many conditions, is here applied to beriberi. 0.2 cc. of 0.8 per cent. NaCl solution injected into the skin produces a small elevation, white in colour, on which the pores of the skin are clearly visible. This bleb in the normal subject is absorbed in from 50 to 90 minutes. This absorption time is notably shortened in "hydropigenous" conditions, e.g. 5-15 mins. in a case of cirrhosis of the liver and ascites with oedema of the legs, 35 mins. in a "mixed" nephritis case and 15 mins. in a case of cardiac dropsy (AZERAI). The figure is also reduced in cases in which there is usually no oedema, e.g. fever, infantile cholera, pregnancy and certain mental conditions.

The Aldrich MacClure test demonstrates the "tissue factor" in the production of oedema and the avidity with which oedematous tissues absorb saline.

In beriberi cases the following results were obtained:—Injections were made into the skin of the arm and leg and it was noted that the bleb was absorbed in 5-6 minutes. The patients were then placed upon a diet rich in vitamin and treated with large doses of theobromin. The oedema rapidly diminished and at the end of ten days the bleb disappearance time had increased to 27-30 mins. in the arm and 21-23 mins. in the leg. Twenty days later, all swelling of the arms having disappeared, the absorption test showed 50-70 mins. in the arm and 20-25 mins. in the legs.

The author draws the following conclusions:—The "tissue factor" plays a great part in beriberi as in other oedematous conditions. The factor is especially evident in wet beriberi where the hydrophil power of the tissues is at a maximum and the bleb is absorbed in about six minutes in the arms and legs. The absorption rate may therefore be a useful guide in prognosis. It would appear that the absorption rate

is greater in beriberi than in renal disease and therefore may be useful in differential diagnosis. When the oedema of beriberi has disappeared, or before it has appeared, the test may still be given and indicates that a hydropigenous state is present.

A. D. B.

MCCARRISON (R.). **Beri-Beri Columbarum. With a Statistical Examination of Experimental Data (Appendix A)** by SUNDARARAJAN (E. R.) and **an Account of the Aerobic Spore-forming Bacilli in Rice (Appendix B)** by GLOSTER (T. H.).—*Indian Med. Res. Memoirs. Supplementary Series to Indian Jl. Med. Res.* 1928. Mar. Memoir No. 10. 146 pp. With 33 figs. (18 on 7 plates).

Clinically beriberi may be defined as a symptom complex of multiple neuritis, cardiac derangement and oedema. Pathologically it shows degenerative changes in the whole nervous system; degeneration of the muscles; cardiac hypertrophy and dilatation, most marked on the right side and associated with fatty degeneration; oedema and serous effusions; passive congestion of the abdominal viscera, with ecchymoses in the mucosa of the stomach and duodenum and enlargement of the suprarenals.

The objects of this investigation are three in number.

(1) To discover whether a condition, as above defined, can be produced in animals by means of a diet of which rice was the staple factor.

(2) To discover whether beriberi-producing rices acted through their contained toxic substances or through vitamin deficiency.

(3) To determine how far true beriberi in animals resembles the human form.

The pigeon was chosen as the experimental animal, 1,872 birds being used in the investigation. Rats were used only for subsidiary purposes.

Polyneuritis columbarum is first discussed. This condition occurs in birds fed exclusively on polished rice and can be prevented by the addition of rice polishings and sometimes cured by the administration of this or other vitamin B material. Clinically the birds show loss of appetite, wasting, subnormal temperature, slow respiration, asthenia, and intestinal and nervous symptoms. Pathologically very detailed methods are given for differentiating this condition from human beriberi. One of the chief differences is that in the former condition the heart is diminished in size.

It is impossible to distinguish clinically between beriberi columbarum and polyneuritis columbarum. Pathologically beriberi columbarum resembles the definition of the human form given above. The following diagnostic criteria are given—when in addition to nervous lesions, cardiac enlargement and degeneration, oedema or serous effusions, muscular degeneration, and passive congestion of the viscera are found in polyneuritic birds, a diagnosis of true beriberi of the wet variety can be made. In the presence of all the above, with the exception of oedema, the dry variety of beriberi can be diagnosed. When the heart is of normal size, yet obviously degenerated, an intermediate form is present, but when the heart is smaller than normal, even though degenerated, the diagnosis is polyneuritis columbarum.

Detailed observations were made regarding the heart both in normal and in deficiently fed pigeons. Careful descriptions are given for distinguishing the cardiac appearances in the various conditions.

A long discussion follows of diets and the effect of adverse conditions upon rice. The possible toxicity of rice receives full consideration as do many factors influencing the birds themselves.

As a result of this section of the work the following conclusions may be drawn.—Beriberi columbarum can be produced in pigeons by feeding them with diets which produce the disease in man. It exactly resembles the human disease in its pathology. The chief factor in the production of the avian form is insufficiency, but not absence, of vitamin B, the most likely diet to produce the disease being one in which the vitamin B value is from 20–50 per cent. lower than the minimum required for normal metabolism. Diets of greater vitamin deficiency are less likely to cause the disease. A toxic agent is produced during metabolism disordered by insufficiency of vitamin B, and this agent is the cause, either wholly or in part, of the clinical and pathological signs of the disease. Certain diets appear to give rise to this agent especially, viz. polished rice to which insufficient amounts of dhal or of ragi were added.

Apparently toxic substances in rice itself are not responsible for the disease. It was found that beriberi is precipitated by cold and damp and that the incubation period in pigeons is from 20 to 110 days.

It is suggested that there are beriberi-like maladies due to dietetic or infectious causes, but the variety met with in the Madras Presidency is believed to be dietetic in origin. Diets associated with the human disease in this area and in Burma are discussed, together with its experimental prevention.

Appendix A of the paper deals with a statistical examination of the experimental data relating to the heart. The author of this section is E. R. Sundararajan.

[Appendix A is a statistical analysis of the heart weights and body weights of 552 deficiently-fed and 348 control pigeons. It is concluded that the general effect of the deficient diets was to cause atrophy of the heart, but where the deficient diet was other than milled rice 25 per cent. of hearts were hypertrophied, indicating "the existence of a specific factor which counteracts the general tendency of the diets to cause cardiac atrophy." J. F. C. H.]

In Appendix B Lt.-Col. T. H. Gloster discusses the aerobic spore-forming bacilli in rice. A full account of the various methods is given, and the following conclusions are drawn :—The aerobic spore-forming bacilli found in the rices examined were those usually present in canned and other foods. There is no reason to suspect that these organisms form beriberi-producing toxins. Rice associated with human beriberi was not found to contain such bacilli in the interior of a large proportion of the grains and the distribution of these organisms in rice does not suggest that they have a causal relation to the disease. Thirty-five types of bacilli prevalent in Indian and Burmese rice were isolated and described.

A. D. B.

PELLAGRA.

GOLDBERGER (Joseph). **Pellagra: its Nature and Prevention.**—*Public Health Rep.* 1927. Sept. 2. Vol. 42. No. 35. pp. 2193-2200.

An attempt is made to answer some of the questions generally asked by the lay public with regard to pellagra. A very careful description of the dermatitis and its usual sites is given. Stress is laid upon suspicious symptoms which may appear before the rash, viz. loss of strength, indigestion and nervousness appearing or made worse in the late winter and early spring; vertigo, epigastric pain, headache, insomnia and constipation. These symptoms, even in the absence of soreness of the tongue, burning of the hands or feet and diarrhoea, are suggestive when occurring in an individual who is a poor eater or in one who has lived upon a deficient diet. There is no ground for worry if milk and meat have been taken habitually in sufficient quantities.

Proper treatment will lessen the mortality of the disease. "It is probable that in each year for every death attributed to the disease there are fully 20 persons with clearly recognisable attacks and probably as many more with debility from the same cause but not definitely marked as such."

The prevalence of pellagra in the Southern States of America and its relation to food production and the cost of living is discussed. Etiological factors are fully described and the impossibility of contagion and the importance of balanced diet are stressed. Careful instructions are given for treatment on dietary lines together with suggestions for the avoidance of recurrences.

A. D. Bigland.

BLOOM (Charles James). **Pellagra in Infancy and Childhood in the United States.**—*Southern Med. J.* 1928. Feb. Vol. 21. No. 2. pp. 124-136.

The paper opens with a historical survey of pellagra in general and an account is given of the various aetiological theories. Tables are presented showing the morbidity and mortality rates of the disease in the various states of North America.

Pellagra in childhood apparently has not received the study which it deserves; in fact the author carefully examined 168 pediatric text books and found that only twenty-two made any mention of the disease at all. The series of cases here discussed comprises 163, most of which were studied in the Charity Hospital, New Orleans.

The number of cases recorded in infants under six months of age is small, the greatest incidence occurring between two and ten years. This is in agreement with the findings of the Thompson-McFadden Commission in its second progress report. The presence of congenital pellagra has not yet been proved in America though the author states that in Europe it is almost an accepted fact that there is a "profound tendency" for the disease to be transmitted from parent to child. The mortality rate is about 15 per cent. of the total cases in children.

As regards incidence, approximately 10 per cent. of the cases are under 15 years and in infancy the small number is probably accounted for by failure to diagnose them. Such children may die from "diarrhoea" before the rash appears. Except about the pubescent period, when females are slightly more frequently attacked than males, sex

plays no part. The same may be said of the race factor, with the exception that the disease does not occur among Jews.

The symptoms are discussed under the usual three headings and are apparently much the same as those encountered in the adult. A fourth heading, the osseous system, is also considered and this is of particular interest. In a review of the literature the author states that no mention is made of the association of the osseous system with pellagra. It was found that a large percentage of pellagrous children had symptoms referable to the joints and long bones. These varied from pain on manipulation to a type of arthritis resembling that found in Still's disease. Dactylitis was observed in three cases.

A. D. B.

CRUTCHFIELD (Earl D.). **Pellagra, with Special Reference to the Skin and Mucous Membrane.**—*Arch. Dermat. & Syph.* 1928. May. Vol. 17. No. 5. pp. 650-657. [11 refs.] [Dept. of Derm. & Syph., Univ. Texas, Galveston.]

Pellagra, like most endemic diseases, tends to show clinical alterations as it adapts itself to its environment or becomes milder. This study, founded upon 125 cases of pellagra in the John Sealy Hospital, Galveston, was undertaken chiefly to analyse these changes, especially as regards the condition of the skin and mucous membranes.

The actual number of cases here reviewed is 109, since 16 of the original series did not present the classical signs and were therefore excluded. The following statistics were collected:—46·4 per cent. were negroes and 74·6 per cent. were females, many being housewives or cooks, 80·7 per cent. were city dwellers and the others came from small towns or lived in the country. 53·47 per cent. had an adequate food supply available. Twelve lived on carbohydrates with meat, and twelve presented disease conditions preventing proper nourishment. Only 18·17 per cent. came from areas not having modern sanitation and in one instance other pellagrins were found in the family. 82 of the 109 cases were seen in their first attack. 48·43 per cent. had diarrhoea. 85 per cent. showed some pathological condition which might be considered contributory. Removal of a focus of absorption in 8 per cent. caused a disappearance of the skin manifestations, suggesting that the lesion may be a toxic dermatitis.

Clinico-pathological study revealed the following:—15·13 per cent. gave a positive Wassermann reaction, or showed clinical evidence of syphilis. A secondary type of anaemia was present in 73·63 per cent. There was a slight lymphocytosis in most of the cases with absolute leucocytosis in 37·53 per cent. 17·15 per cent. showed marked leucopenia. The blood pressure was uniformly low and 42 patients had subnormal temperatures. 23·2 per cent. had slight albuminuria. Of 18 per cent. which had gastric analyses, 60 per cent. revealed a hypo-acidity. In 9 per cent. the spinal fluid was examined and only 2 showed an increase of cells or globulin. The stools revealed no higher percentage of parasites than was found in other patients.

A study of the mucous membranes showed 64·57 per cent. with lesions in this situation. Glossitis was the most common. Stomatitis occurred in 21·27 per cent., gingivitis in 16·14 per cent., vulvo-vaginitis in 12·1 per cent., and proctitis in 10·09 per cent. The author is of the opinion that such lesions are as important in the diagnosis as the skin manifestations.

A full account of the skin changes is given. 78·79 per cent. presented such lesions. The chief conclusions to be noted under this heading are that trauma plays a more important part in their production than photodynamic action and that the skin lesions in pellagra are becoming milder and more atypical.

"The treatment in all cases was a balanced diet with a high protein intake. 64 patients improved; 8 recovered without subsequent attacks and 19 died, a mortality of 20 per cent."

Ten cases came to autopsy. Neither the skin nor mucous membranes presented specific changes pathognomonic of pellagra. There was a marked thinning of the mucosa, especially that of the proximal portions of the small intestines. The only other constant change was fatty degeneration of the liver.

A. D. B.

GARRISON (C. W.). **Economic Aspects of Pellagra.**—*Southern Med. J.* 1928. Mar. Vol. 21. No. 3. pp. 237-238.

The author pleads for fuller economic recognition of pellagra on account of its increasing prevalence, especially in Arkansas. It is impossible, owing to faulty statistics, to arrive at an accurate morbidity figure, but "when an insidious, lingering disease reaches the proportions of 5,000 to 10,000 cases with approximately 500 deaths per annum in a population of 1,800,000, it should become a live issue not confined to the economist and statistician, but for the commonwealth."

Efforts should be directed to the matter of food production and supply. A campaign is in progress which has for its object the raising of more food stuffs for home consumption. The author is of the opinion that the application of such a programme to the plantation or tenant farmer is of the utmost importance. He urges business men and those who extend credit to see that the landlord furnishes garden plots and compels his tenants to raise gardens, keep chickens and, if possible, a cow. It is confidently asserted that if every individual farmer and tenant farmer would carry out this proposal and that if arrangements were made for the slaughter and sale of a few beef cattle in every community, pellagra would be greatly reduced and much economic benefit would accrue.

A. D. B.

FERREIRA (Manuel J.). *Hématologie de la pellagre.* [**The Blood in Pellagra.**]—*C. R. Soc. Biol.* 1928. Feb. 24. Vol. 98. No. 7. pp. 549-551. [1 ref.] [Inst. of Histol. & Embryol., Faculty of Med., Porto.]

Studies of the blood in pellagra have been made by numerous workers; but an analysis of the literature shows that the findings are not in agreement. This paper records observations made upon 36 pellagra cases, in all grades of severity.

Anaemia was constantly found and anisocytosis was frequent. In nine cases the R.B.C. count varied between 2,900,000 and 3,500,000, while in 20 cases the number was below 4 million. The white cell count ranged between 3,900 and 8,250. A lymphocytosis was found in nearly all cases and was most marked in those of slight severity. The percentage of mononuclear cells was usually normal, but an

eosinophilia was noted in over half the cases and seemed to be associated with a predominance of nervous symptoms.

The author attempts to arrive at the significance of the above findings. The anaemia represents a lowered vitality of the haemopoietic system, especially the bone marrow. The lymphocytosis is similar to that found in beriberi, scurvy, inanition and glandular affections, such as hypo-function of the thyroid and suprarenal. The eosinophilia is accounted for by vagal hypertonia, resulting from an endocrino-sympathetic dysfunction.

A. D. B.

MOLLOV (W.). Ueber Beziehungen der Pellagra zur *perniziösen Anämie. [**Relations of Pellagra to Pernicious Anaemia.**]*—Arch. f. Schiffs- u. Trop.-Hyg.* 1928. May. Vol. 32. No. 5. pp. 250–253. [2 refs.] [Intern. Clinic., Univ. Sofia, Bulgaria.]

Pellagra and pernicious anaemia, when each is fully developed, represent distinct clinical entities. There are, however, many points of similarity and in some cases the diagnosis is in doubt. Two cases from the University Clinic at Sofia are described. *Case 1.* A fifty year old peasant woman. For 18 years she had suffered from typical pellagra attacks occurring in the spring and associated with diarrhoea and sore tongue. On examination she presented the following:—anaemia; a sub-icteric tinge of the skin; a raw and fissured tongue; achylia; slight splenic enlargement. In the blood the R.B.C. numbered 730,000 with marked anisocytosis, poikilocytosis and polychromasia. The haemoglobin was 20 per cent., the colour index 1·3 and the leucocyte count 3,800. Her condition improved and she left the clinic.

Case 2. An ill-developed girl of 16 years. She came under observation at the clinic in August, 1927. For the last three years she had suffered each spring and summer from dermatitis of the hands and diarrhoea. She was quite well in the winter. She had eaten largely of maize bread, and pellagra was diagnosed. On examination she presented the following:—anaemia; pigmented, raw and hyperkeratotic skin on hands and feet; smooth tongue; no splenic enlargement; R.B.C. 700,000 with some anisocytosis, slight poikilocytosis and polychromasia. The haemoglobin was 15 per cent., the colour index 1·1 and the leucocytes numbered 2,850 with some lymphocytosis and 8 per cent. eosinophilia. (Ascaris infection was present.) Van den Bergh reaction was negative and there was absolute achylia. Pernicious anaemia was diagnosed and under liver treatment she made a remarkable recovery, the diarrhoea stopped and she gained weight.

These two cases appear to be pellagra in which haemolytic anaemia has supervened. The author believes that both conditions are due to an intestinal toxin which in some cases attacks the central nervous and sympathetic nervous system giving rise to pellagra, and in others the haemopoietic system causing pernicious anaemia.

A. D. B.

RILLE. Ueber Pellagra. [**Pellagra.**]*—Arch. f. Dermat. u. Syph.* 1928. Apr. 23. Vol. 155. (Kongressbericht). pp. 227–229.

A female case of pellagra was admitted to the Leipsic Dermatological Clinic in July, 1926. The patient came from Poland and had not lived upon

an exclusive maize diet. She presented the typical skin appearances of the disease in the usual situations, including the neck. Areas of dermatitis were observed on the back, in the axillae and on the elbows. The tongue was denuded and red at the tip and a vulvitis was present. There was no rash on the face and no mention is made of diarrhoea. Mental changes, amounting almost to paranoia, were noted.

The patient died after two days' pyrexial illness in November, when the rash had disappeared. No mention is made of an autopsy, though a necrotic inflammation of the pharynx, oesophagus, stomach and small intestine is given as the cause of death.

The author discusses the differential diagnosis of pellagra from the dermatological point of view. Sunburn in alcoholics and in cachectic cases may show a similar dermatitis. Tertiary syphilis also may give the same picture and, in three cases of arsenic poisoning, Casal's necklace was present.

A. D. B.

PAUL (Norman). **Pellagrous Dermatitis.**—*Med. Jl. Australia.* 1928. May 5. 15th Year. Vol. 1. No. 18. pp. 548-549. With 2 text figs.

A sporadic case of pellagra was shown by the author at a meeting of the Sydney Hospital Clinical Society.

Male aged 46. For thirteen years has suffered from progressive weakness. For some time he had been in an edentulous condition and has therefore lived mainly on farinaceous foods, with a moderate supplement of beer. Dermatitis on the hands and forearms began five to six years previous to examination and the patient was under the author's observation for the last two years. It was noted that a small plate of bread and milk in the morning and a small cup of mutton broth in the evening, satisfied his appetite. He showed irritability, general weakness, vertigo, flatulence, soreness at the left angle of the mouth and he had suffered from ulcers on each eye. There was no diarrhoea and the urine was normal. Photographs show pellagrous dermatitis on the hands, forearms and neck. The face was also affected and the rash was accompanied by the usual subjective symptoms. Skin sections were examined.

A. D. B.

FINDLAY (G. M.) **Pellagra-like Lesions associated with Deficiency of Vitamin B₂ in the Rat.**—*Jl. Path. & Bact.* 1928. Apr. Vol. 31. No. 2. pp. 353-364. With 8 figs. on 2 plates. [21 refs.] [Labs. of the Imperial Cancer Research Fund, London.] [Summary appears also in *Bulletin of Hygiene.*]

The pathology of vitamin B₂ (anti-pellagric?) as distinct from vitamin B₁ (antineuritic) deficiency was studied in the rat. Yeast (autoclaved at 120° C. for 5 hr.) was used as a source of vitamin B₂ and a yeast extract (Peters') as a source of B₁. Rats receiving B₂ only died in about 5 weeks, occasionally with symptoms of polyneuritis, and showing the histological appearances characteristic of starvation. Rats receiving B₁ and lacking B₂ lived longer (10-13 weeks) and in about 8 to 10 weeks developed skin lesions with loss of hair and ulcers of the mouth, death occurring in 2 to 3 weeks after the onset of skin lesions. A detailed histological examination of the tissues showed the pathological changes to be mild and characteristic of those found in

simple inanition. The squamous epithelium of the cardiac portion of the stomach showed in all cases a papillomatous proliferation, but this is considered to be due to the ingestion of hair which must contaminate the food in considerable amount. Hypertrophy of the suprarenal glands was a constant feature in rats lacking either B₁ or B₂, the histology of the gland being similar to that found after exposure of the rat to cold or in the presence of a slight toxæmia. The evidence obtained favoured the idea of the dual nature of vitamin B and it is noted that many of the features of vitamin B₂ deficiency in the rat bear a similarity to those of human pellagra.

H. N. H. Green.

UNDERHILL (F. P.) & MENDEL (L. B.). **A Dietary Deficiency Canine Disease—Further Experiments on the Diseased Condition in Dogs described as Pellagra-like by Chittenden and Underhill and Possibly Related to So-Called Black Tongue.**—*Amer. Jl. Physiol.* 1928. Apr. Vol. 84. No. 3. pp. 589–633. With 2 coloured plates. [10 refs.] [Depts. of Pharmacol. & Toxicol. & Physiol. Chem., Yale Univ., New Haven, Conn.] [Summary appears also in *Bulletin of Hygiene*.]

A disease may be induced in dogs in from 1 to 8 months by feeding on a diet containing boiled peas as the chief source of nitrogen. The disease is characterized by a foul stomatitis and an acute haemorrhagic ileocolitis, and spontaneous recovery does not occur. On pathological and clinical grounds it has been suggested that this syndrome is identical with the condition in dogs known as "black tongue," and that "black tongue" might prove to be the analogue of pellagra in man. The authors fed a diet containing dried peas, cracker meal and cottonseed oil to dogs and readily produced the disease. Many variations in this diet were made and as a result it was found that butter fat cured the disease. Vitamin A was naturally suspected as the potent factor, but good cod-liver oil proved useless in treatment or prevention, though it had a slight beneficial effect on the length of survival. The addition of yeast, an increase in the nitrogen intake whether in the form of peas or meat, or the addition of a salt mixture, did not prevent the disease, though the appearance of symptoms might be delayed. Fresh pig's liver prevented the onset of the disease, but both butter if stored (even in cold storage) and liver if dried at a low temperature, lost some of their potency. The observation that a sample of butter which had lost its curative potency had also lost its yellow colour, led to a search for the responsible agent amongst the carotinoid pigments. Egg yolk proved to contain the factor, but not in as large amount as butter, whilst carrots were found to contain more of the curative agent than butter fat. An ether extract of lard and carrots proved potent. Crystallized carotin (re-crystallized 6 times) in doses of 5mgm. daily, caused the symptoms to disappear in from 10–15 days and the dogs developed a marked degree of resistance to the disease when the carotin was withdrawn. If the effect is due to a contaminant of carotin, it must be present in very minute quantities. GOLDBERGER has reported no improvement in "black tongue" or human pellagra from the administration of butter fat, and failure to cure pellagra with carrots. The authors do not comment, for full details of GOLDBERGER's work are not yet to hand.

H. N. H. Green.

GOLDBERGER (Joseph), WHEELER (G. A.), LILLIE (R. D.) & ROGERS (L. M.). **A Further Study of Experimental Blacktongue with Special Reference to the Blacktongue Preventive in Yeast.**—*Public Health Rep.* 1928. Mar. 23. Vol. 43. No. 12. pp. 657-694. [14 refs.]

The authors' summary of this long and detailed paper gives the main points and conclusions most clearly and is, therefore, quoted in full :—

" The blacktongue producing potency of a basic experimental diet and of three modifications was tested 33 times in 31 dogs with the production of 33 separate attacks of blacktongue. Only one of these attacks developed at the end of a period longer than 61 days.

" Experimental blacktongue is due to a dietary deficiency which is capable of being corrected by something contained in yeast.

" This something, or blacktongue preventive, in yeast is inactivated or destroyed by heat sufficient to char the yeast; retains its preventive potency in large measure, if not entirely, after heating in the steam autoclave at a pressure of 15 pounds for seven and one-half hours; and is adsorbed from an acidulated aqueous extract of either dried yeast or of yeast first autoclaved at a pressure of 15 pounds for two and one-half hours by English fuller's earth. It cannot be identified with any of the older well-recognized dietary essentials, but it is believed to be identical with the thermostable substance of Smith and Hendrick.

" The blacktongue preventive and the pellagra preventive are both present in yeast. Taken in conjunction with certain other evidence pointing to the fundamental identity of blacktongue and pellagra, this association strengthens the probability that the blacktongue preventive and the pellagra preventive, or vitamin P-P, are identical."

A. D. B.

GOLDBERGER (Joseph), WHEELER (G. A.), LILLIE (R. D.) & ROGERS (L. M.). **A Study of the Blacktongue-Preventive Action of 16 Foodstuffs, with Special Reference to the Identity of Blacktongue of Dogs and Pellagra of Man.**—*Public Health Rep.* 1928. June 8. Vol. 43. No. 23. pp. 1385-1454. [16 refs.] [Summary appears also in *Bulletin of Hygiene.*]

In these detailed experiments various foods have been tested for their preventive and curative properties in dogs on a standard basal diet known to produce blacktongue symptoms. The basal diets were based on the diets found in association with the occurrence of pellagra and contained usually a large amount of maize. Eleven of the foodstuffs were studied for their preventive action in both blacktongue and pellagra. In 8 of these, knowledge of their preventive potency in pellagra permitted a rough but satisfactory comparison and in each case the preventive potency for pellagra was strikingly similar to that for blacktongue. These findings considered with the clinical resemblance of the disease in dogs to that in man, the suggestion of a common aetiology by feeding experiments, the effectiveness of dried yeast in both conditions, together with the production of a pellagra-like condition in rats by feeding a diet deficient in a food factor indistinguishable from the blacktongue preventive, and the marked similarity of the histological tissue changes of blacktongue and pellagra, make it very probable that experimental blacktongue and pellagra are identical conditions. If this conclusion is correct, then the results of tests of preventive action in dogs are applicable to man. Maize, whole wheat, cowpea, milk, soy bean, butter, cod-liver oil, cotton-

seed oil, canned tomatoes, carrots and the rutabaga turnip were found to contain none or only slight amounts of the blacktongue preventive factor. Wheat germ, beef muscle, pork liver, canned salmon, egg yolk contain more or less adequate amounts of this factor. Liver, salmon and egg yolk, though not yet studied directly in pellagra, are recommended in the treatment and prevention of human pellagra on the basis of the dog-feeding experiments.

H. N. H. Green.

DENTON (James). **A Study of the Tissue Changes in Experimental Black Tongue of Dogs compared with Similar Changes in Pellagra.**—*Amer. Jl. Path.* 1928. July. Vol. 4. No. 4. pp. 341-351. With 6 figs. on 3 plates. [3 refs.] [Dept. of Path., Cornell Med. School, New York, N.Y.]

The morbid anatomy of the condition known as experimental black tongue in dogs is here described. The animals were chosen from among those used by GOLDBERGER in his experiments. They were killed by coal gas and autopsies were performed immediately after death.

The macroscopic appearances found post mortem were as follows:—

(a) *In the mouth.*—All grades of inflammation, varying from a reddening of the oral mucosa in early stages to superficial necrosis, with the formation of a pseudo-membrane, as the disease neared its termination. This latter condition was apt to spread downwards involving the whole upper alimentary tract.

(b) *Skin.*—Four out of seven male dogs showed lesions of the scrotal skin.

(c) *Intestines.*—Earlier cases showed no changes in this situation, but in three later specimens the colon was thinner than normal and the mucous membrane was reddened and stained with reddish brown mucus.

(d) *Other organs.*—No gross changes were found in the bones, periosteum, brain or cord.

Very thorough histological examinations were made of various organs and tissues and these are well illustrated by micro-photographs. It is impossible to give a detailed description of the changes met with in various situations, suffice it to say that the lesions "originate in a degenerative process affecting the superficial connective tissue of the mucous and dermal membranes." Secondary changes follow in the overlying epithelium and the final picture is one of an intensely necrotic and diphtheritic inflammation of the upper alimentary tract. No histological changes were found in the central nervous system or in any other organs.

A comparison between the above findings and those met with in human pellagra is given. "The lesions of the skin, mouth, pharynx, oesophagus and colon in pellagra and in experimental black tongue in dogs show very similar gross appearances. Histologically the lesions of both appear to have their inception in a degenerative process in an analogous tissue element. The processes of repair in both result in fibrotic replacement and in pathological vascularization of the superficial stroma of the mucous membrane of the upper alimentary tract and of the corium." Secondary infection tends to occur.

A. D. B.

HEAT STROKE.

SMITH (Eben E.). **Heat Stroke : a Thermoregulatory Incompetency.**—*U.S. Nav. Med. Bull.* 1928. July. Vol. 26. No. 3. pp. 479–502. With 6 plates. [34 refs.] [U.S. Nav. Med. School, Washington, D.C.]

This is a general review of the effects of heat on the thermo-regulatory mechanism of the body, to which are added certain personal observations on the pathology of the tissues in animals (dogs) dying of heat exhaustion [see this *Bulletin*, Vol. 25, p. 322 (HALL & WAKEFIELD)] The paper contains nothing absolutely new, but it is an excellent summary of work done by others during the past years and the author gives a most valuable list of references. Plates are given showing the morbid histology of the colon, intestinal mucosa, kidney and thyroid in the animals examined by the author.

J. H. Tull Walsh.

LEGER (Marcel). Considérations sur le coup de chaleur. [**Notes on Heat Stroke.**]—*Rev. Prat. Malad. des Pays Chauds.* 1928. Jan. Year 7. Vol. 8. No. 1. pp. 7–17. [7 refs.].

This is a general review of “sun stroke” and “heat stroke.” The author refers to the different rays of the spectrum and the fact that each or all combined may produce evil conditions according to length of time of application. He refers to the deaths of three chimpanzees at the Institute of Biology, Dakar—see this *Bulletin*, Vol. 20, p. 70 (LEGER). Since then the author has made experiments on guineapigs exposed to 40°–45° C. with hygrometric conditions varying from 45 to 76. He has observed:—Diminution of red blood corpuscles and lowering of total haemoglobin; a disturbance of leucocyte equilibrium, with polynuclear neutrophiles and diminution of eosinophiles and deviation to the right of the Arneeth image.

J. H. T. W.

SCHAEFFER (Henri F.). Recherches sur la thérapeutique du coup de chaleur. [**Treatment of Heat Stroke.**]—*Ann. d' Hyg. Pub. Indust. et Sociale.* 1927. Apr. Vol. 5. No. 4. pp. 224–231.

The author begins with a general review of the pathological conditions accompanying heat stroke. Turning to treatment he mentions baths, cardiac tonics, bleeding and injection of artificial serum. He thinks it better to place the patient in a bath at 37° C. and to reduce the temperature with blocks of ice rather than begin at once with a very cold bath; there should be good ventilation and electric fans to cool the air. But the most important part of the treatment is to renew the fluid in the organism. For that purpose subcutaneous injections of artificial serum should be used. BONNETTE has employed this method in heat syncope. “In very serious cases one should proceed to slowly inject luke-warm serum into a vein without considering it necessary to previously withdraw a certain amount of blood.” The author also considers that subcutaneous injections of oxygen and, if necessary, intracardiac injections of adrenalin would be of use in heat asphyxia.

J. H. T. W.

- i. THROWER (Rayner). **Heat Cramp.** [Memoranda.]—*Brit. Med. Jl.* 1928. Mar. 31. p. 546.
- ii. HALDANE (J. S.). **Heat Cramp.** [Correspondence.]—*Ibid.* Apr. 7. pp. 609-610.

i. The author refers to cases analogous to fireman's cramp occurring amongst the engine room staff of a modern motor vessel, who, though submitted to hard work, do not have the excessive toil of the ordinary ship's fireman. The high engine-room temperature (130° F.) sometimes reached in the tropics is an obvious factor, but associated with it is the rather stagnant air, which is vitiated by exhaust fumes with a high percentage of carbon dioxide. The cases occurred in men of the finest physique, the onset occurring after several days' exposure to the conditions, with malaise, headache and crampy pains in the limbs and abdomen. The body temperature was well over 100° F., with rapid pulse. Twenty-four hours off duty, with drugs to relieve pain and body fluids replaced, served to restore them to normal. As a prophylactic the addition of salt in small amounts to the drinking water, seemed to prove efficacious. Heat cramp in firemen is usually ascribed to excessive tissue fluid and salt loss.

ii. Professor Haldane, commenting on the cases described above, entertains little doubt that the cause of the cramp is acute poisoning by water. The "osmotic pressure" of the blood must be kept constant. It depends on the relative concentrations of water molecules and, in the case of the blood, more particularly on the concentrations of sodium chloride. The kidneys regulate this osmotic pressure; but in men engaged in heavy muscular exertion they are almost completely thrown out of action. A man who is sweating hard and working hard and is at the same time drinking water to relieve thirst, is losing chloride rapidly and replacing the sweat, which contains about a quarter per cent. of sodium chloride, by practically pure water. The kidneys cannot deal with the excess water pressure and the result is acute rise in the diffusion pressure of water or fall in the "osmotic pressure"; and violent attacks of cramp are symptomatic of this. [v. this *Bulletin*, Vol. 23, p. 457 (*U.S. Nav. Med. Bulletin*).]

J. H. T. W.

- HOFFMANN (W.). Ein Fall von Sonnenstich.—*Schweiz. Med. Woch.* 1927. Oct. 15. Vol. 57. No. 42. pp. 1008-1009. [2 refs.]
- HUIZENGA (L. S.). A Case of Heat Stroke.—*China Med. Jl.* 1927. June. Vol. 41. No. 6. p. 566.

BLACKWATER FEVER.

STEPHENS (J. W. W.). **The Distribution of Blackwater Fever in Europe.**—*Ann. Trop. Med. & Parasit.* 1927. Dec. 31. Vol. 21. No. 4. pp. 467–478. With 3 maps. [43 refs.]

——. **The Distribution of Blackwater Fever in South West Asia.**—*Ibid.* 1928. June 12. Vol. 22. No. 1. pp. 53–58. With 2 maps. [15 refs.]

Under the title blackwater fever are included cases designated as quinine haemoglobinuria. In the first paper cases which occurred during the Great War are excluded, owing to the uncertainty as to where they really originated; cases occurring in patients who have recently returned from the Tropics are also excluded. The papers consisted of a series of records showing the distribution of the disease. They are illustrated by maps and contain an extensive bibliography.

W. Yorke.

POPOW (Peter) & ZEISS (Heinz). Weitere Untersuchungen ueber das Schwarzwasserfieber in Russland. [**Further Investigations of Blackwater Fever in Russia.**]—*Abhandl. a. d. Gebiet d. Auslands-kunde. Hamburg. Univ.* 1927. Vol. 26. (D., Med. & Vet. Vol. 2.) [Festschrift NOCHT.] pp. 438–445. [15 refs.] [Trop. Inst., & Pasteur Inst., Moscow.]

The following summary is given :—

1. Blackwater fever in Russia has hitherto been observed in St. Petersburg, Moscow, Kasan, Saratow, Astrachan, Noworossijsk, Batum, Suchum, Baku, Transcaucasia (Araxtal) Sowjetarmenia (Eriwan and district), Transcaspia (Merw and district). The damp districts are specially afflicted; i.e., the ports and coast towns (St. Petersburg, Noworossijsk, Batum, Suchum, Baku), the towns lying on rivers (Kasan, Saratow, Astrachan, Moscow); and the river valleys and coast oases (Araxtal, Merw, Grosny, Sanaim, Eriwan).

2. The natives are attacked in the same manner as strangers.

3. Altogether the authors have obtained information regarding 337 patients suffering from blackwater fever in Russia. Of these, 297 (88·1 per cent.) were men and 40 were women. The death rate varies. It is recorded by different observers as 0 per cent., 8 per cent., 11 per cent., 20 per cent., 22 per cent., 39 per cent., 50 per cent., 100 per cent.

4. The average death rate was 41·4 per cent.

5. The interval between the attack and the malarial infection is variously given as: 1 day, 1–6 months, 2, 6, 19 and 34 years.

6. Blackwater fever cases occur in Russia in the winter or in the early spring or late autumn. The climatic cold in Russia plays in the precipitation of blackwater fever a definite, but not a decisive part.

W. Y.

CHELL (G. R. H.). **Report on Blackwater Fever in Uganda for 1926.**—*Uganda Protectorate Ann. Med. & San. Rep. for the Year ended 31st December, 1926.* Appendix No. 1. pp. 61–64.

Of the 170 cases of blackwater reported in Uganda during the year 1926, 50 were fatal. The case death rate is not markedly above the average, but there has been a decided increase in the morbidity rate, both among Europeans and Asiatics. The author believes this to be

associated with the fact that there was a decided increase in the rainfall during the year, and that four of the cases occurred among Europeans and seven among Asiatics employed on railway construction. One of the most noticeable features brought out in the review of the cases is the decided influence of exertion or exposure during an attack of malaria in precipitating the onset of blackwater fever, more especially in conjunction with a history of alcoholism and insufficiently treated malaria.

The general summary of the signs and symptoms exhibited by the cases is given.

In a series of eleven tables data are collected showing (1) the number of cases, deaths, and case mortality from this disease in Uganda for the past twenty years; (2) the stations or localities at which blackwater was contracted; (3) the race and sex incidence; (4) the ages of the patients; (5) the distribution of the cases in the non-official sections of the population; (4) the length of residence in the tropics; (7) the number of previous attacks of blackwater; (8) mosquito protection, quinine habits; (9) the result of blood examination; (10) the cause of death; and (11) the duration of haemoglobinuria.

W. Y.

CARPENTER (G. D. Hale). **A Case of Blackwater Fever in an African Native.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1927. Nov. 25. Vol. 21. No. 3. pp. 237-238.

A brief clinical account is given of a case of blackwater fever in an Acholi native. The notes are admittedly very incomplete and it is much regretted that the urine was not examined microscopically. The patient made an uninterrupted recovery. Six other cases with similar symptoms were shortly afterwards reported by the native dresser, all of them in Madi natives. Carpenter remarks that it is of interest that the natives are apparently unfamiliar with the disease and have no name for it. He records that the medical officer of Madi was attacked with blackwater fever a few months before the native, who was the subject of this paper, developed his attack.

W. Y.

MACKEY (C.). **Blackwater Fever in a Native Child.**—*West African Med. Jl.* Lagos. 1928. Jan. Vol. 1. No. 3. p. 43.

Details are given concerning an attack of blackwater fever in a child 2½ years old. The boy was born in West Africa and had lived at Warri for about a year prior to the attack of blackwater. He had had several attacks of malaria. On the day the attack commenced, the child was reported to have eaten a hearty breakfast about 11 in the morning. At 1 p.m. there was a rigor, and at 2 p.m. dark, brown urine was passed. At 9 a.m. the next day jaundice was noticed. Vomiting set in, and the restlessness and thirst were more pronounced. Temperature 102°, pulse 166, respirations 30. Four ounces of brown urine were passed. The blood films contained *P. falciparum*. Two hours later the patient became unconscious and death supervened at 1 p.m.

W. Y.

SENIOR-WHITE (Ronald). **A Case of Identical Delirium in Repeated Attacks of Blackwater Fever at Long Intervals.**—*Indian Med. Gaz.* 1928. May. Vol. 63. No. 5. pp. 271-272.

The patient, who first went to the tropics in 1901, had an attack of malaria in East Africa in 1903, and subsequently after his return to

Johannesburg developed blackwater fever. This attack was accompanied by delirium, which was associated with the rather troublesome work on which he had previously been engaged. After the blackwater fever he was invalided home. Subsequently, he went to India and had more malaria between 1907 and 1915, becoming a "chronic relapser"; but after this period his condition improved, and he described himself as having become acclimatized. After September, 1926, he had another attack of blackwater fever, and during this attack he experienced delirium absolutely identical with that of his primary attack twenty-three years previously with the same delusion of counting gusset plates. The author points out that the occurrence of the delirium after such a long interval, and especially after twelve months' employment on totally different duties is interesting.

W. Y.

CASTEX (Mariana R.), GONZÁLEZ (Hernán) & POLETTI (Roque A.). La hemoglobinuria malárica. [**Malarial Haemoglobinuria.**]—*Prensa Méd. Argentina.* 1928. Apr. 20. Vol. 14. No. 32. pp. 1145-1153. [22 refs.]

This is an account of a man of 27 years whose history was known from the time of a first attack of malaria in September, 1924, with recurrences at intervals till February, 1928, when on the morning following an attack he took a tablet of sulphate of quinine at 4 a.m., and another at 7.30 a.m. At noon he had a violent shivering fit with headache and vomiting and haemoglobinuria. He was treated by injections of caffeine and adrenalin.

The case was one of average severity and recovery took place. The remainder of the paper is occupied with general remarks on the condition and a brief but clear description of GHIRON'S haemolysis curve and the way in which it is obtained.

H. Harold Scott.

TRABADOROS (A. G.). Die Therapie des Schwarzwasserfiebers. [**The Therapy of Blackwater Fever.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1928. May. Vol. 32. No. 5. pp. 229-235. [1 ref.] [Municipal Hosp., Patras, Greece.]

In the Province of Patras (Greece) blackwater fever is still treated with large doses of quinine and ostensibly with good results. Between 1898 and 1927 there were 16,127 patients in the state hospital of Patras; amongst these 3,568 (22.13 per cent.) were malarial and of these 51 had blackwater fever and 7 died. The general treatment given is 1 to 1.5 gm. of quinine intramuscularly twice daily on the first, second, third and fourth days until the fever subsides; and in addition diuretics, glucose and saline injections, ice compresses, and cardiac tonics. Quinine was never given orally on account of the digestive disturbances which are usually associated with blackwater. It is pointed out that of course this quinine treatment was only employed in cases in which there was no idiosyncrasy or tendency to renal haemorrhage. Thirteen of the sixteen cases seen by the author were cured by this treatment.

Reference is then made to the fact that others, especially the Germans, avoid quinine in blackwater. CARDAMATIS at Athens records 24.42 per cent. of deaths amongst those treated by quinine and 7.32 per cent. among those who were not given quinine. KLEMPERER and SCHILLING recommend the greatest caution in administering quinine to blackwater patients. The question therefore arises which method should be followed.

The author believes that quinine is indicated in all cases in which the patient has been infected with malaria for a long time, in which the attack was preceded by febrile disturbances and in which exposure and over exertion were the causes. In such cases, where for 24 hours no quinine has been given and no idiosyncrasy to the drug exists, the above treatment with large intramuscular injections of quinine should at once be given. The second method of treatment without quinine should be adopted in cases of quinine hypersensitiveness and further in cases in which even small doses of quinine cause bleeding from the nose and kidneys. This class of case has only occasionally been seen by the author in his practice. Furthermore, quinine is contra-indicated in cases in which, owing to excessive haemolysis, the strength of the patient is very much reduced, where the pulse is small and feeble, and where the heart is weak and the blood pressure low. In this class of case large doses of quinine may cause death through heart failure.

Therapy of blackwater fever must have four chief objects in view :

- (1) The haemolysis must be stopped ; (2) Diuresis must be produced ;
- (3) The organism weakened by haemolysis must be strengthened ;
- (4) The remaining symptoms of the disease must be controlled.

There follows a summary of the various procedures by which the author believes these desirable results may be achieved.

The paper closes with a short summary of the author's experience of plasmochin in the treatment of malaria.

W. Y.

BURKE (Edmund). **A Note on the Intravenous Administration of Sodium Bicarbonate in Blackwater Fever.**—*Indian Med. Gaz.* 1928. Mar. Vol. 63. No. 3. pp. 130-131. [2 refs.]

Details are given of the successful treatment of a severe case of blackwater fever by intravenous injection of sodium bicarbonate (150 grains to the pint of distilled water) as recommended by HANSCHSELL [this *Bulletin*, Vol. 24, p. 667].

Emphasis is laid on the following interesting features of the case :—

" (1) The patient was never in the habit of taking "prophylactic" quinine. His blackwater fever therefore was not connected with abuse of this drug.

" (2) No other drug was used throughout the illness except the sodium bicarbonate. Water, of course, was pushed after the vomiting ceased.

" (3) The marked diuresis and rapid return to normal of the urine produced by the comparatively small amount of sodium bicarbonate given—17½ ozs. (Hanschell gave his case two infusions of one pint each.)

" (4) The sodium bicarbonate undoubtedly promoted rapid and definite diuresis with alkalinity, thus preventing suppression from renal obstruction due to precipitated haemoglobin in the kidney tubules."

W. Y.

WESTPHAL (Kurt). **Akute Hämolyse nach Chininbehandlung einer Impfmalaria.** [**Acute Haemolysis after Quinine Treatment of a Case of Inoculation Malaria.**]—*Klin. Woch.* 1927. Dec. 24. Vol. 6. No. 52. p. 2474. [5 refs.] [*Psychiat. & Nerve Clinic, Univ., Marburg.*]

In considering the risks of the malaria treatment WEYGANDT drew attention to that of quinine idiosyncrasy : this, however, is but rarely

seen and only three cases have hitherto been described—two by MÜHLENS and KIRSCHBAUM, and one by SCHILLING and JOSSMANN.

Details are given of a case which came under the observation of the author. The patient was a woman of 48 years of age, who contracted syphilis in 1914, and was found to be suffering from general paralysis in August, 1927. On August 27th she was inoculated intramuscularly with 10 cc. of malaria blood. The strain used had been employed for this purpose in the clinic for some time and had shown nothing abnormal. After the eighth paroxysm treatment was administered on account of cardiac failure. On October 17th a dose of .3 gm. of quinine was given, during the evening .15 gm. of myosalvarsan intramuscularly, and the next morning .2 gm. of quinine. During this day the patient was observed to have become extraordinarily pale. Blood examination showed haemoglobin 40 per cent., erythrocytes 1,100,000 per cmm. and leucocytes 21,600 per cmm. The urine was not dark, but contained albumin, urobilin, and urobilinogen. The patient sank and died on the night of October 19th.

The post-mortem showed signs of general paralysis, malaria, and haemolysis, but threw no light on the aetiology of the blood destruction. SCHILLING considers such anaemias to be latent haemolysis, and blackwater to be only the anaphylactic increase of blood processes which are less acute in all cases of malaria. Such an explanation is probably correct. Even without quinine quite severe anaemia may arise in cases of inoculated malaria. In the cases cited the coincidence of the administration of quinine and the haemolysis suggests that over sensitiveness to quinine was a precipitating factor. Whether in this case quinine or salvarsan or both together caused the anaphylactic action cannot be determined.

W. Y.

ROSS (G. R.). **Bilirubinaemia in Malignant Tertian Malaria and Blackwater Fever.**—*Brit. Jl. Experim. Path.* 1927. Dec. Vol. 8. No. 6. pp. 442-454. [11 refs.] [London School of Hyg. & Trop. Med., London.]

The author has investigated the question whether the bilirubinaemia which exists in malaria is due to bilirubin of the immature type, produced by the reticulo-endothelial system in excess of the 'handling' capacities of the hepatic cells, or whether it is due to bilirubin of the mature variety which has been reabsorbed back into the blood as a result of an obstructive lesion somewhere in the biliary system distal to the actual hepatic cell. In an endeavour to prove blackwater fever to be a sequel or complication of malignant tertian malaria the nature and degree of bilirubinaemia was studied. Furthermore, it was desired to obtain information on the site of haemolysis in blackwater fever, so that BARRATT and YORKE'S (1909) claim that haemolysis took place in the blood stream could be compared with that of PLEHN (1920), who considers that it is extravascular and renal in origin; if the van den Bergh reaction gave indirect positive results in the disease, it could logically be concluded that haemolysis was intravascular.

The technique employed in the investigation was based on the recommendations of McNEE and KEEFER (1925); the qualitative test employed was that of LEPEHNE (1920-21) and the quantitative that of THANNHAUSER and ANDERSEN (1921). Oxalated plasma—at least 2 cc.—was used whenever possible, in order that an adequate amount of fluid should be available for the colorimetric estimation, which was made with a Klett bicolorimeter. The colour standard first employed was an ethereal solution of iron rhodonate, but this was later

replaced by an aqueous solution of anhydrous cobaltous sulphate, which was found to give more satisfactory results. In cases of blackwater fever it was sometimes exceedingly difficult to read the results of both the qualitative and quantitative tests. The reasons for this, which depend on the presence of haemoglobinaemia, are discussed. In cases where the degree of haemoglobinaemia was high it was impossible to estimate the number of units of bilirubin present; although by comparison with a control test, in which sulphanilic acid was added alone to the plasma, it was possible to state that the test was strongly positive. The results, however, show that the degree of bilirubinaemia in blackwater fever is such that the error introduced in this way can be looked upon as being of minor importance. In addition to the van den Bergh reaction, the qualitative test introduced by FOUCHET was performed on the plasma of all cases. Here again the presence of blood pigment in the plasma interfered with colour development. The testing of the plasma was done as soon as possible after withdrawal as delay interfered with the rate and degree of colour development, and in the case of specimens sent from remote districts the number of units recorded is probably too low.

The results obtained on the examination of 30 cases of *P. falciparum* infection are shown in a table. In 29 of the 30 the degree of bilirubinaemia was above normal. As regards the degree of bilirubinaemia, 4 cases showed less than 1 unit, 12 between 1 and 2 units, 5 between 2 and 3 units, 3 between 3 and 4 units, 5 between 4 and 5 units, and 1 above 7 units. The last case was found to be infected with *Schistosoma* in addition to malaria; there was hepatic enlargement and the occurrence of a direct positive result indicated that an obstructive lesion was present. In those patients who had received quinine treatment the degree of bilirubinaemia tended on the whole to be greater. As the examination was invariably made within 24 hours of the commencement of adequate treatment the observations supported the statement of KINGSBURY that the immediate effect of oral quinine in malignant tertian malaria is to cause an increase in the degree of bilirubinaemia and that this rise may be observed for about 24 hours. Further observations showed that the ultimate result of quinine was to restore the degree of bilirubinaemia to normal. There is, therefore, justification for the belief that one of the results of quinine administration in malaria is the production of an intravascular haemolysis. As the ultimate result of quinine treatment is to reduce the bilirubinaemia to normal and as this improvement is synchronous with the abatement of the clinical symptoms of the disease and the disappearance of parasites from the blood, it can be reasonably assumed that the initial haemolysis after quinine is due to lysis of infected corpuscles and that the ultimate reduction of the bilirubinaemia indicates failure of the parasites to infect further cells. The Fouchet test gave little information beyond demonstrating an excess of bilirubin, and is not so delicate as the van den Bergh reaction.

Turning to the question of bilirubinaemia in blackwater fever the author states that it was important to determine to what extent bilirubinaemia was influenced by the clinical type of the disease and consequently the cases were classified as follows:—

Type 1: Cases with malignant tertian malaria in whom extremely mild haemoglobinuria developed.

Type 2: Cases with definite haemoglobinuria of moderate severity; no suppression; recovery.

Type 3: Cases with severe haemoglobinuria; no suppression; death in 24-48 hours.

Type 4: Cases with severe haemoglobinuria; almost immediate suppression; anuria lasting 7-10 days; death.

Type 5: Cases with long-continued haemoglobinuria lasting up to a week; no suppression; recovery.

The results of the Fouchet and van den Bergh tests on these 5 types of blackwater fever are given in the following table:—

TABLE III.

Type.	Case No.	M.T. parasites at time of examination.	Fouchet	Van den Bergh.		Time of examination.	Recovery or death.
				Direct.	Indirect.		
Group I	1	+	++	0	6	1st day	Recovery
	2	+	++	0	6	"	"
	3	+	++	0	6.4	"	"
	4	+	++	0	6.8	"	"
Group II	5	+	++	0	10.4	"	"
	6	—	++	0	8.5*	?	"
	7	—	++	0	6.8*	?	"
	8	—	++	0	5.2*	?	"
	9	+	++	0	16	1st day	"
	10	—	++	0	8.2	"	"
	11	—	++	0	9.1	"	"
	12	—	++	0	7.4	"	"
	13	—	++	0	11.6	"	"
Group III	14	—	++	0	20.8	?	Death
	15	+	++	0	6.5	1st day	"
	16	—	++	0	13†	"	"
Group IV	17	—	++	++	18.4†	3rd day	"
	18	—	++	++	27	4th day	"
	19	—	++	++	59	"	"
Group V	20	—	++	0	6.2	1st day	Recovery
	21	—	++	0	11.4	"	"

* Specimens in which more than 24 hours had elapsed between withdrawal and examination.

† Approximate values. Excess of free haemoglobin in plasma.

Clinical details are given of a number of these cases when they are considered to be worthy of special attention. From this table it is seen that all cases gave a degree of bilirubinaemia which is much higher than that which exists in malignant tertian malaria. In all but two an indirect positive result was obtained; this indicates that the bilirubinaemia, initially at least, is due to the abnormal haemolysis which occurs in the disease and represents an increased effort on the part of the normal mechanism of disposal to get rid of the excess of circulating haemoglobin. The fact that bilirubinaemia of this type exists can further be said to prove the truth of BARRATT and YORKE's theory that haemolysis is intravascular, for no such phenomenon would accompany an extravascular haemolysis in the renal tubules.

It would appear that if the haemoglobinaemia is such that it can be directly represented by a bilirubinaemia of less than 6, the renal

mechanism of disposal is not called into play ; at, or about this value, the haemoglobin begins to appear in the urine.

The author considers that the reticulo-endothelial system must be regarded as an important factor in the disposal of free haemoglobin, but must be divorced from any connexion with the appearance of haemoglobin in the urine. Haemoglobinuria depends upon the rate and extent of the haemolytic process, and once a certain renal threshold value for haemoglobin has been reached, excretion of haemoglobin by the kidney begins. The extent and duration of the bilirubinaemia depends upon the rapidity and extent of the excretion of haemoglobin by the renal route, and also upon the capacity of the body to dispose of the additional bile formed.

Referring to the mechanism of excretion of free haemoglobin, Ross states that apparently the appearance of haemoglobin in the urine depends entirely on the concentration of haemoglobin in the plasma. In malaria cases, haemolysis, though sudden, is relatively slight, the threshold value for haemoglobin is not reached, and the reticulo-endothelial system is able to dispose of the excess present. When the concentration of haemoglobin exceeds the threshold value immediate excretion by the kidneys occurs and the reticulo-endothelial system at the same time becomes active in an independent effort to remove the haemoglobin. The extent to which the latter is called upon depends on the rate and degree of renal excretion and when anuria occurs it may have to undertake the whole duty. In these cases there is a possibility that obstruction of the whole biliary system may supervene and that a complete cessation of the whole excretory mechanism may occur. It can be assumed that the renal threshold value for haemoglobin does not vary with the individual, but can be represented by a uniform constant value.

W. Y.

Ross (G. R.). **Erythrocyte Fragility Test.**—*Ann. Trop. Med. & Parasit.* 1928. June 12. Vol. 22. No. 1. pp. 5-16. With 3 graphs in text. [10 refs.]

Reference is made to recent papers dealing with the technique of the erythrocyte fragility test and the disadvantages and limitations of the test as usually employed, i.e., adding a measured quantity of blood to solutions of sodium chloride of diminishing concentration and noting by naked eye observation the points of commencing and complete haemolysis, are discussed. In order to overcome the theoretical and practical disadvantages associated with the usual manner of testing the erythrocyte fragility, at least two modifications in the technique are necessary. In the first place, the ionic constitution of the hypotonic fluids must approximate to that of the plasma, and secondly the test must give an adequate idea of how the resistance of the erythrocytes is distributed during haemolysis. These essentials have been borne in mind in the test devised by Simmel. In this a standard fluid of the following composition is first made up:—

Sodium chloride	...	...	...	8.2 grammes
Potassium chloride	...	...	...	0.2 "
Magnesium chloride	...	...	...	0.2 "
Calcium chloride	...	...	...	0.2 "
Sodium acid phosphate	...	...	...	0.2 "
Sodium bicarbonate	...	...	...	0.05 "
Distilled water	...	...	...	1,000 cc.

This fluid, it is claimed, is isotonic with whole blood, is buffered to the same degree, and contains the salts practically to the same amount as they are present in blood. A series of hypotonic solutions is then made up, these solutions containing, respectively, 70 per cent., 60 per cent., 50 per cent. and 40 per cent. of the standard fluid, each being made up to 100 cc. with the distilled water. The test is conducted as follows :—

"An erythrocyte count is made in the usual manner, employing Hayem's fluid, or the standard fluid, as the diluting medium. At the same time, in ordinary blood pipettes, blood is diluted 1 in 400 with each of the four hypotonic fluids. The blood is thoroughly mixed and the pipettes allowed to stand at room temperature for one hour. At the end of this time, the pipettes are again thoroughly shaken and the number of erythrocytes remaining are counted on any of the usual forms of blood-counting apparatus. The results are expressed first as content per 1 c.mm. of blood, and the figures then reduced to percentages of the normal erythrocyte count previously determined.

"Thus in the test a numerical computation of the number of surviving erythrocytes at the various degrees of hypotonicity is substituted for ocular appreciation of degrees of haemolysis, which substitution undoubtedly permits of more accurate knowledge being obtained of the process of haemolysis and the distribution of resistances amongst the corpuscles."

The results which hitherto have been obtained by the ordinary fragility test have been for the most part negative in blackwater fever. STEPHENS and CHRISTOPHERS, CHRISTOPHERS and BENTLEY, and DUDGEON have reported no change from the normal, but BIJON is quoted as finding diminished resistance, whilst other authors have reported increased resistance. With the object of obtaining further and more detailed information, a number of cases of blackwater fever and malaria, along with normal persons, were tested by Simmel's technique, which was slightly modified in one particular, viz., that the sodium chloride content of the standard fluid only was reduced, the other constituents remaining constant. The behaviour of normal erythrocytes, or erythrocytes from cases of malignant tertian malaria and from cases of blackwater fever is shown in tables and charts. No appreciable change from the normal curve of erythrocyte resistance to hypotonic saline was demonstrated in blackwater fever. This, the author considers, can be most easily explained by the fact that resistance to hypotonic saline is no guide to the resistance possessed by the erythrocytes to other haemolytic processes. It seems perfectly legitimate to conclude that the haemolytic process in blackwater fever is one which is independent of osmotic changes in the corpuscles.

Reference is made to BARCROFT's recent work on the spleen, and to the fact that he considers that the more fragile the corpuscle is to hypotonic saline, the more likelihood there is of its being retained in the splenic pulp. Ross states that the situation may be summarized by saying that if the haemolytic process of blackwater fever takes place in the general circulation, then results of hypotonicity tests would seem to prove that osmotic changes in the corpuscles do not account for the phenomenon, but the possibility of the process taking place in some organ, probably the spleen, must always be considered in each case. Even if osmosis were responsible, no change in the circulating corpuscles could be expected as long as the spleen retained its differential filtering function.

· W. Y.

LEGA (Giulio). Sul processo emolitico nell'emoglobinuria dei malarici. [**On the Haemolytic Process in Malarial Haemoglobinuria.**]—*Riv. di Malarologia*. 1928. Mar.-Apr. Vol. 7. No. 2. pp. 85-95. [9 refs.] [English summary p. 213.] [Royal Inst. of Clin. Med., Rome.]

Experiments were performed in order to ascertain the haemolytic power of the serum of malaria cases in which attacks of haemoglobinuria were provoked by quinine, quinidine, or cinchonine. The serum was mixed with the hydrochlorides of the alkaloids and tested with erythrocytes of malarial or haemoglobinuric patients by means of Ghiron's technique.

Haemolysis always occurred in the quinine tubes; it also occurred with quinidine when used with the serum of a quinine, or quinidine, haemoglobinuric patient. With cinchonine the reaction was positive only if the serum was obtained from a cinchonine haemoglobinuric case.

These results point to the conclusion that quinine salts may provoke the haemoglobinuric paroxysm more easily than other salts, and that cinchonine salts are the best tolerated if the attack is not caused by the administration of cinchonine.

W. Y.

RAPOPORT (J. L.). Zur Pathogenese des Schwarzwasserfiebers. [**The Pathogenesis of Blackwater Fever.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1928. Feb. Vol. 32. No. 2. pp. 69-82. With 6 text figs. [9 refs.] [II. State Univ., Moscow.]

The extent of the malaria epidemic in Russia during the last years has afforded an opportunity of studying, both clinically and pathologically, the various forms of this disease and of its complications. In Russia blackwater fever is extremely rare. Pathological details are given of a case which died in the Moscow clinic, and which, the author believes, throws some light on the mechanism of production of blackwater, and more especially on the site of the haemolysis. Regarding this question there appears to be three possible answers: (1) The haemolysis occurs in the entire blood stream, but in this case free haemoglobin should be seen in the blood; (2) Great haemolysis takes place in those organs which are normally concerned with this process, viz, liver, spleen, and bonemarrow; in this case the free haemoglobin would also pass through the blood; and (3) the destruction of erythrocytes is limited to the kidneys.

The occurrence of the first of these processes must be characterized by a number of appearances which accompany any intravascular haemolysis. One would expect on histological investigation of the organs to find a considerable number of shadow-erythrocytes since in a haemolysis lasting some days these could scarcely disappear from the blood. Moreover, the path of the free haemoglobin must be marked by an imbibition of all the organs and tissues of its decomposition products. The same must also apply in the second of the three possible alternatives. None of these appearances were, however, found on microscopical examination of the tissues of the author's patient; and this appears sufficient to throw doubt on the correctness of either of the first two hypotheses.

The author then goes on to quote from the literature regarding the rareness with which any substantial degree of haemoglobinaemia

has been found in cases of blackwater fever; and he also refers to the fact that no alteration in the osmotic resistance of the erythrocytes has yet been demonstrated in this disease.

The author considers as unsupported the tendency of certain authors (LEBEDEW, LEVY, SALVIOLI) to consider the changes in the kidneys of blackwater fever cases to be the result of filtration of free haemoglobin through them. The nephrotoxic properties of haemoglobin have long been known: various authors (SCHMIDT) have shown that even a continuous circulation of free haemoglobin in the plasma produces no widespread degenerative process or necrosis of the kidneys. Furthermore, the author was afforded the opportunity of examining the kidneys in a number of cases of arsenic poisoning in which acute haemolysis occurred, but in none of them did he find changes in the kidney comparable to those seen in blackwater fever.

These observations, in the opinion of Rapoport, render the first two hypotheses untenable and forces us to accept the third as the correct one. This has the support of GIEMSA, ACHARD, and especially of PLEHN. The author then considers in detail the hypothesis of PLEHN and other who agree with him, and finds support for this hypothesis in his own observations.

The conclusions are:—

1. In the case under observation a severe degenerative affection of the renal tubules, with well-marked desquamation of the epithelial cells and the formation of casts, had taken place.
2. Later, the basement membrane of the tubules and the walls of the neighbouring capillaries were destroyed.
3. In such places the blood escaped from the capillaries into the partially destroyed tubules.
4. In the tubules a rapid destruction of the erythrocytes took place, so that the haematuria was masked by haemoglobinuria.

[The author does not appear to be familiar with the experimental work of the reviewer on this subject (1911) nor with the much more recent work of other English authors. PLEHN'S theory has been discussed at length in this *Bulletin*, Vol. 19, p. 631.]

W. Y.

EBERT (M. K.). Sur la pathogénèse de l'hémoglobinurie dans le paludisme. [**The Pathogeny of Haemoglobinuria in Malaria.**]—*Arb. a.d. Microbiol. Inst. d. Volksunterrichtskommissariats*. 1927. Vol. 3. French summary pp. 399–400. [In Russian pp. 254–270. 12 refs.]

KRITSCHESKY and MOURATOVA (this *Bulletin*, Vol. 21, p. 386) have advanced the hypothesis that haemoglobinuria in malaria is provoked by the combined action of quinine and the lipoids of the organism. They showed that the serum of certain individuals is capable of activating *in vitro* the haemolysis of human red cells provoked by quinine. The action of the quinine is analogous to that of cobra venom; it is provoked by active serum as well as by serum inactivated at 56 to 62°C. for half an hour. The author assumes that the activating substance is lecithin, which is able to activate quinine *in vitro*. The individuality of the erythrocytes plays an important part in the reaction. The presence of haemoglobinuria depends upon the properties of the erythrocytes and of the serum. In malaria, as well as in other infections, transmutation of the lipoids is increased.

The author has confirmed all the findings of KRITSCHESKY and MOURATOVA. He has found that certain human sera activate the haemolysis provoked by quinine, but that other sera, on the contrary, inhibit it.

W. Y.

BLACKLOCK (D. B.) & MACDONALD (G.). **The Mechanism of Blackwater Fever and Certain Allied Conditions.**--*Brit. Med. Jl.* 1928. July 28. pp. 145-149. [30 refs.]

In this paper an etiological theory is advanced which the authors believe to be entirely new, but, which, from the evidence they have accumulated, they consider is correct.

It is generally agreed that blackwater fever arises mainly in the course of prolonged infection with *P. falciparum*. There is no evidence that this parasite produces a toxin different from that of the other malaria parasites and the explanation of the association must be sought in some other biological factor. The chief differential characters of *P. falciparum* are that it sporulates in the internal organs and that the cells containing the sporulating forms adhere to each other and to the vessel walls. The authors are convinced that the association between blackwater fever and *P. falciparum* must depend on these distinctive biological characters of this parasite.

Attention is drawn to a group of haemoglobinurias and haemoglobinaemias, which, at first sight, have little relationship to each other, but which on close investigation reveal notable features in common. These are: (1) blackwater fever, (2) pernicious anaemia complicated by venous thrombosis, (3) Raynaud's disease, (4) haemoglobinurias in dogs after exercise, (5) haemoglobinuria from marching, and (6) myoglobinuria in horses. It is considered that all these have the state of anoxaemia in common; a difference between them lies in the manner in which this is brought about.

The authors next pass to a consideration of the effects of deficient oxygenation, and refer to the recent physiological work of HILL, LONG, LUPTON, FURUSAWA, and others, from which it appears that deficiency of oxygen from whatever cause produces an excess of lactic acid in the blood. As all the haemoglobinurias in the above list are associated with oxygen deficiency, the authors are driven to the conclusion that in each of them an excess of lactic acid is produced. It appeared then essential to investigate what haemolytic properties lactic acid possesses. A supply, as pure as possible, of sodium and ammonium dextrolactate and also of dextrolactic acid itself, was obtained from Dr. Martindale. The sodium and ammonium salt proved non-haemolytic, in any concentration possible in the human body, to human red cells *in vitro*. The acid proved highly haemolytic to washed red cells, complete haemolysis being obtained in a dilution of 1:600 and slight haemolysis in 1:1,200, when a 10 per cent. suspension of red cells was used. Further experiments were then undertaken to determine the haemolytic action on citrated whole blood, and from these *in vitro* experiments it appeared probable that if a concentration of 1:400 of sarcolactic acid could be brought about in the blood of an animal haemolysis would result.

Enormous quantities of sarcolactic acid are produced in the animal body by exertion, but it is extremely difficult to approach such quantities by means of injection. If strong solutions are injected, there is a risk of killing the animal; if, on the other hand, dilute solutions are used, the bulk of the injection is so great that the process

takes a long time to complete and the necessary haemolytic concentration is not obtained. The result of intravenous injections of various amounts and concentrations of lactic acid are given in a table. In two rabbits haemoglobinuria was produced and in several others haemoglobinaemia. The injection of 100 cc. of 2 per cent. solution resulted in haemoglobinaemia only, whereas the injections of 20 cc. of 4 per cent. solution produced haemoglobinuria. Evidence derived from *in vitro* experiments showed that the latter strength of acid, acting on different volumes of blood, produced different results according to the final concentration. When this was greater than 1 per cent., oxyhaemoglobin was not formed, while when haemolysis ensued at weaker concentrations oxyhaemoglobin was liberated. It appears probable that the concentration of acid which was responsible for the haemolysis in the rabbits lay between 0.25 per cent. and 1.0 per cent.

Summarizing their results to this point the authors state that they have shown that there exists in blackwater fever and certain allied conditions the common factor of deficient oxygenation; they have illustrated how this deficient oxygenation gives rise to the production of lactic acid; and finally they have shown that lactic acid is haemolytic *in vitro* and also *in vivo* in doses well borne by the animals.

It is considered that these facts make it probable that lactic acid is the haemolytic agent responsible for the production of blackwater fever. The anaemia produced by chronic malignant malaria, the stasis in the circulation of such an organ as the spleen brought about by the agglutination of parasitized red cells, and the frequently observed venous thrombosis result in a considerable degree of local anoxaemia and lactic acid accumulation. If the main exciting causes of blackwater fever be such as will produce contraction of the spleen, already enlarged in volume and choked with parasitized red cells, it is concluded that the circulation in the spleen will thereby still further be impeded and that the local anoxaemia will be increased.

On various grounds it is concluded that the commonest exciting causes of blackwater fever are exertion and chill, and that each of these produces marked contraction of the spleen. Quinine is another exciting cause and it likewise causes active contraction of the spleen. "The contraction of the spleen on agglutinated masses of parasitized red cells accentuates, as we have said, the local anoxaemia; further production of lactic acid necessarily follows, especially on exertion, and finally the local concentration reaches such a level that haemolysis occurs. Leakage of haemoglobin into the portal circulation results as soon as haemolysis commences, and becomes pronounced when the circulation through the spleen is re-established." It is probable that a similar process may go on in other organs and reference is made to the massive infection of the placenta in endemic areas.

A distinction in mechanism is made between typical blackwater fever and those occasional cases in which numerous parasites are present in the blood throughout the attacks. In the latter cases the most probable explanation of the haemoglobinuria is that it is largely due to direct destruction of infected red cells by the parasite during schizogony, a condition rather comparable with piroplasmosis of dogs than blackwater fever in man. [There does not seem to be much evidence in support of this hypothesis: the action on the red cell of *Babesia canis* appears to be essentially different from that of *Plasmodium falciparum*. In the one case the haemoglobin is set free more or less unchanged into the plasma, and in the other it is radically

changed. Again, a heavy blood infection with *Babesia canis* is invariably associated with intense haemoglobinaemia and haemoglobinuria; far otherwise is the case in heavy blood infections with *Plasmodium falciparum*.]

Statistics compiled by STEPHENS show that the majority of attacks occur after six months' residence and before the end of five years' residence in the tropics. The authors explain this on the ground that some time is required before the malaria parasite produces a marked degree of anaemia, and for the spleen to enlarge: the relative freedom in later years is due to fibrosis of the spleen and consequently less capability of contraction, and an acquired tolerance to the parasite.

It has long been recognized that there is a grave risk in moving a case of blackwater fever even with all possible precautions, and even for short journeys. The authors consider the explanation of this to be that the patient is extremely anaemic; in order to avoid discomfort to which he is subjected in transit he will contract his muscles continually, thus producing lactic acid in amounts which cannot be properly oxidized. It is to this lactic acid production that the relapses, which occur so frequently when blackwater fever patients are moved, are attributed. [Probably the authors are quite correct when they state that there is a grave risk in moving blackwater fever patients: but is the risk greater than that incurred in moving other classes of patient equally ill? Furthermore, what is the evidence that the risk is one of relapse of haemoglobinuria and not, for example, one of heart failure?]

The early and often intense jaundice of blackwater fever can, in the authors' opinion, be explained by the site of the haemolysis. The haemoglobin is usually delivered directly into the portal system and thus reaches the liver in a concentrated form.

[It is hardly necessary to emphasize, what will at once be evident from the extensive summary given above, that this article is a very ingenious hypothesis to explain the mechanism of the production of some of the cardinal symptoms of blackwater fever. It rests on a somewhat limited experimental basis and some of the statements and deductions are obviously open to discussion. Nevertheless, the article is a serious contribution, well worth consulting in the original, and one which is suggestive for future investigation. The discovery that a normal constituent of body metabolism, i.e., sarcolactic acid, has a haemolytic effect seems to be of considerable importance.]

W. Y.

NIERENSTEIN (M.). **The Mechanism of Blackwater Fever.** [Correspondence].—*Brit. Med. J.* 1928. Aug. 4. p. 223. [4 refs.]

Referring to the article by BLACKLOCK and MACDONALD [*supra*], the author states that "it is obvious . . . in spite of the arguments brought forward by these authors . . . that sarcolactic acid by itself does not account for the precipitation of blackwater fever by quinine." He draws attention to an observation made ten years ago by himself that urines of thirteen cases of blackwater fever contained large quantities of a strongly haemolytic disintegration product of quinine to which the name haemoquinic acid was given [this *Bulletin*, Vol. 15, p. 433]. Like sarcolactic acid, haemoquinic acid is an oxidation product; the latter being derived from quinine through fission of the two nuclei.

W. Y.

LABORATORY REPORTS.

MADRAS. **Report of the King Institute of Preventive Medicine Guindy for the Year ending 31st March 1927.** [KING (H. H.), Officiating Director.]—pp. 35+3. 1927. Madras: Govt. Press. [8 annas.]

In the vaccine-lymph business the number of doses issued during the year was well over $2\frac{1}{2}$ million. In primary vaccination the case success rate was 96.4, and the insertion success rate 87.6. In the routine of the bacteriology department a case of continued post-partum fever, where an organism of the paratyphoid group was isolated which did not react seriously to any known types of paratyphoid A, B, C, is noticed; also a case of acute and fatal meningitis where a growth of paratyphoid C was obtained from the cerebro-spinal fluid. In the analytical chemistry department a stable preparation of a colloidal lead salt, believed to be novel, was devised, for treatment of cancer, by an adaptation of Amberger's method for the preparation of colloidal silver. In the various malaria-surveys the dangerous Anopheles usually observed were *culicifacies*, *fuliginosus*, *stephensi*, and *listoni*; in one locality in the Nellore district almost every inhabitant had a history of recent malaria, 96 per cent. of the children in the main village had malaria parasites in the blood, and the spleen-rate was 54.4; it is stated [without any further particulars] that in this locality "the infection rate in *A. culicifacies* and *A. fuliginosus* was as high as 10 per cent." Original research of an unusually purposive kind has been carried on, besides these malaria surveys. Among more than a score we may notice (a) an epidemiological and bacterial survey [in progress] of the Todas—an aboriginal tribe of the Nilgheri hills—undertaken on the information that their numbers are diminishing; (b) an investigation of streptococci in cases of puerperal fever, of which the conclusions from the first 200 cases are that *S. pyogenes* is the most important species, especially in severe cases, *S. subacidus* the next in importance, and *S. anginosus*—a common inhabitant of the vagina—not entirely unimportant; that in septicaemia the only organisms isolated were streptococci and *Bact. coli*, whereas in sapraemia a variety of other microbes was observed; and that the vagina of pregnant women in good health does not usually harbour pathogenic organisms; (c) a bacterial investigation of intraocular inflammations [which is the subject of a special report of the Ophthalmic Hospital]; (d) an attempt serologically to differentiate *Bact. coli* and all lactose-fermenters of human source from those of various outside sources [in progress]; (e) a study of Rhinosporidium confirming ASHWORTH'S discovery of its relations among the Fungi; (f) a study of 7 strains of non-typical vibrios found in water disclosing the fact that although by intra-peritoneal injection six of them were pathogenous to guineapigs none of these agglutinated with true cholera high-titre serum in any dilution. A purely scientific piece of work particularly felicitous in its instructive range and promise outside biology has been the study of the *Filaria flavescens* parasite of *Calotes versicolor*—an Agamid lizard common in gardens throughout India. The development of the micro-filaria has been discovered to take place very readily in *Culex fatigans*.

A. Alcock.

RANGOON. First Annual Report of the Harcourt Butler Institute of Public Health, Rangoon, for the Year 1926. [JOLLY (G.), Director.]—4 pp. With 2 plans. 1927. Rangoon. [As. 4=5d.]

This brief first annual report recounts the inception and creation of the Harcourt Butler Institute of Public Health in Rangoon. The staff under the Director includes an assistant, a chemist, an assistant chemist, and a bacteriology assistant, besides an officer to nurse an embryonic malaria bureau. The chemistry and bacteriology laboratories are at work, and classes of instruction for sanitary inspectors have been started. The beginnings of a library and museum are evident.

A. A.

UGANDA PROTECTORATE. Annual Report of the Laboratory Services Division of the Medical Department for the Year ended 31st December, 1927. [DUKE (H. Lyndhurst), Deputy Director of Laboratory Services.]—14 pp. 1928. Entebbe. [2s.]

This Annual Report includes an independent statement from the branch laboratory established in June at Kampala.

The Entebbe laboratory having been constituted the centre for trypanosomiasis research for the various East African Protectorates the experiment of housing the Veterinary Laboratory under its roof has been discontinued, and further facilities for research, including a self-contained six-bed ward for patients, and a cold-storage plant and refrigerating chamber, an electric centrifuge and shaker, and electric light for photography and dark-ground illumination—all supplied by an independently-owned plant ("there being as yet no electrical nor water supply for the Entebbe township") have been provided. The trypanosomiasis investigations in progress include studies in immunity and observations of the reaction of the mammalian host upon the transmissibility of the parasite by tsetse-fly. The duty of collecting and recording information about the distribution of tsetse-flies throughout the Protectorate has been undertaken. Examinations of fishermen working in the Uganda section of Lake Victoria, carried out during the last six months of the year, have disclosed not a single case of human trypanosomiasis among them.

Dr. MARTIN'S investigations of 1,361 pond-snails from the shore of Lake Victoria have revealed 8 per cent. infected with cercariae, and of these infections 8 per cent. were fork-tailed cercariae, of five different types. The branch laboratory has been established to ensure for hospitals in Kampala and district (and for the rest of the country so far as circumstances permit) a well-equipped modern service of clinical pathology. Since the officer in charge must spend much time in visiting various hospitals in the vicinity "an interesting development is the commencement of systematic post-mortem examinations in certain cases." It is already apparent that malignant neoplasms are not uncommon among the local Africans.

A. A.

KENYA, Colony & Protectorate of: Annual Report of the Medical Research Laboratory for the Year 1926. [KAUNTZE (W. H.), Director.]—*Kenya Ann. Med. Rep. for Year ending 31st December, 1926.* pp. 89-121.

Most of this well-arranged report deals with what is sometimes spoken of disrespectfully as routine work; although it is not easy to

understand how in an outlying tropical country alert attention to the daily round is to be distinguished from research.

In the routine of the pathology section 18 sarcomata and 19 diverse carcinomata were observed among 44 tumours from native Africans. Of 5,470 blood-smears examined for malaria in the section of bacteriology, 2,333 showed parasites, the vast majority, namely, 2,244, of the single infections and 13 of a few mixed infections being *P. falciparum*. Multiple infestations of intestinal worms and protozoa were common; the number of cases in which *Taenia* were found was 862; of *Trichuris*, 530; of *Ancylostoma*, 516; of *Ascaris*, 484; of *Strongyloides*, 120; of *Schistosoma mansoni*, 87; of *Oxyuris*, 7. *Schistosoma haematobium* eggs were present in 6 out of 10 urines examined *ad hoc*. *Bacillus* of tubercle was found in 34 of 255 specimens of sputum. In the first 9 months of the year, when only spleen-smears of trapped rats were sent for inspection, only two out of 1,280 showed the plague bacillus; but when, in the last 3 months of the year, all the rats found dead were brought 25 per cent. were found infected. The report on medical zoology contains several interesting items. Of 154 stomach-contents of *Glossina palpalis* 24.6 per cent. gave the precipitin test for human blood. *Anopheles costalis* has been determined as the "domestic" species in Nairobi and in all the districts investigated, in the months March–September, and the dangerous species, since four out of 338 specimens caught in selected quarters were found infected with malaria parasites. It breeds in open pools and drying river-beds, but not in papyrus swamps (though such swamps in process of reclamation may provide good conditions for breeding). It also breeds freely in irrigation canals, improper drains, and borrow-pits. It is enormously prevalent over all other species during and after the long rains—the malarial fever season. At other times of the year *A. christyi* and *A. cinereus* take its place, but not in anything like the same numbers. *A. funestus*, *A. transvaalensis*, and *A. rhodesiensis* are rarely taken in dwellings; but *A. funestus* has seasons and places of abundance, and on two occasions a "wild" specimen has been found infected. *A. mauritanus*, *A. pretoriensis*, and *A. maculipalpis* are all numerous in certain places. The majority of house rats caught are the common *Rattus rattus kiyabius*, and their predominant fleas are *Xenopsylla cheopis* and *brasilensis* and *Echidnophaga gallinacca*. *X. cheopis* is the prevalent flea in towns and permanent buildings, *X. brasiliensis* in native huts and bomas. The following were the fleas taken from rats caught in plague-stricken villages: *X. brasiliensis*, 79; *Echidnophaga*, 25; *Dinopsyllus*, 2; *Ctenocephalus*, 3. In the biochemistry section a special study of native diets and nutrition in relation to disease and, in particular, to ulcers, is in progress.

A. A

SOUTH AFRICAN INSTITUTE FOR MEDICAL RESEARCH. **Annual Report for the Year ended 31st December, 1926.** [LISTER (F. Spencer), Director.]—53 pp. With 2 charts & 2 plates. 1927. Johannesburg.

Of the 35 pages of this report that bespeak general professional attention 13 record the special and 22 the routine investigations of the Institute. From the research division we learn that active plague among veld rodents has been noted in three districts; that plague-infected fleas can survive in the veld, apart from a host, for 3 (or possibly

4) months and still be infective; and that the Namaqua gerbille (*Desmodillus auricularis*) possesses very considerable powers of resistance to plague. The fauna of the veld now known to get naturally infected with plague includes 11 species of rodents and 1 carnivore; and 6 other species of rodents and 2 other species of carnivora have been found susceptible experimentally. An idea is at work that the "Tiger River disease" of gerbilles, due to *Bacterium monocytogenes*, might be employed against these pestiferous veld rodents.

Research in entomology has been directed to the bionomy of rodent ectoparasites and to a mosquito survey of the Union. The entomologist notes, as a good and cheap way of destroying fleas in mealy bags, simple exposure of the bags to sun and wind.

In the helminthology department Dr. Annie PORTER records some interesting facts about *Schistosoma spindale*, a species first observed in cattle in India. She now reports two instances of human infestation with this parasite, in S. Africa, and the discovery of its molluscan intermediary hosts—*Planorbis pfeifferi* and *Isodora tropica*.

In the report of the routine department we may notice that amoebic was more prevalent than bacillary dysentery; that in blood examinations for malaria parasites the numbers of cases of benign and malignant tertian were about equal; that 11 cases of carcinoma and 2 cases of sarcoma were certified histologically in native Africans; and a brief account of a female case with a history of gonorrhoea, in which gonococci were discovered not in the expected places but only post-mortem by culture from vegetations on the aortic valves.

A. A.

PALESTINE. **Annual Report of the Laboratory Section Department of Health Government of Palestine for the Year 1926.** [STUART (G.), Administrative Officer in Charge.]—*Ann. Rep. Dept. of Health, Palestine, 1926.* pp. 58-87.

This is a very full and instructive report, from the bacteriology section, of which the following statistics of general interest are selected.

In the course of six years, during which 163,803 blood-films have been analysed, malaria parasites have been found in 23,745, the percentage of benign tertian being 66.25, of malignant tertian 31.69, and of quartan 2.06. Attention is drawn to the fact that this percentage of quartan is at startling variance with the 20.10 recorded by MÜHLENS from his examination of all cases of malaria in the same locality in December, 1912, and January, 1913.

Among 136 specimens of pathological tissues were 12 identifications of carcinoma, 4 of adenocarcinoma, 2 of adenoma, and 2 of sarcoma.

Among 26,620 urines examined eggs of *Schistosoma haematobium* occurred in 55. The distribution of infected snails, which was thought to be restricted to the vicinity of Jaffa, has now been found to extend to Um Khaled.

Tubercle bacillus was present in 463 of 2,671 specimens of sputa submitted. The leprosy bacillus was found in 19 out of 55 nasal smears taken from inmates of the local leper hospital.

The following species were observed in examination of 22,227 specimens of faeces: *Entamoeba histolytica* free in 1,963, and encysted in 265; *Giardia intestinalis* in 319; *Chilomastix mesnili* in 6; *Trichomonas intestinalis* in 659; and among worm eggs *Schistosoma mansoni* in 7, although "there is no authentic case of intestinal schistosomiasis having been contracted in Palestine."

Helminth statistics more comprehensive than those of the current year—80,942 examinations of faeces—may be taken as indicative of the relative incidence of species in Palestine, and are as follows :—

	Number of persons infested.	Percentage of total cases of infestation.
<i>Trichuris trichiura</i>	6,745	53.1
<i>Ascaris lumbricoides</i>	4,587	36.1
<i>Taenia saginata</i>	769	6.0
<i>Oxyuris vermicularis</i>	254	2.0
<i>Hymenolepis nana</i>	229	1.8
<i>Ancylostoma duodenale</i>	61	0.5
<i>Schistosoma mansoni</i>	60	0.5

Rat-catching goes on systematically at ports ; and of a total of 5,808 rats examined during the last four years 57 have been found plague-infected.

No case of rabies in man was recorded during the year although the 477 persons treated included 187 that had been bitten by animals definitely known to be rabid. Negri bodies were found in 59 of 76 animal brains examined. Only 3 cases of smallpox are known to have occurred, and there was also a general immunity to enteric and cholera. All these results are attributed to the efficacy of the vaccine department.

A. A.

WOLFF (J. W.). Jaarverslag van het pathologisch laboratorium te Medan-Deli over 1927. [**Annual Report of the Pathological Laboratory at Medan-Deli for 1927.**].—15 pp. With 1 plate & 1 fig. Medan.

In this report there is given an account of the staff and their movements, with various details of the educational, statistical and propagandist activities of the laboratory. Routine laboratory examinations were numerous : Bacteriological, 8,112 ; histological, 343, with 52 post mortems ; serological, Wassermann tests, 9,056, and a number of tests by the method of SACHS-GEORGI and KAHN ; chemical of water, stomach contents, faeces, urine and rice samples. The preparation of vaccine lymph and antisera is also undertaken.

W. F. Harvey.

TRANSACTIONS OF THE ROYAL SOCIETY OF TROPICAL MEDICINE AND HYGIENE. 1928. Jan. 31. Vol. 21. No. 4. pp. 255-264. With 2 plates & 1 text fig. [2 refs.].—**Laboratory Meeting.**

Major H. C. BROWN demonstrated the application of the adhesion phenomenon to the differentiation of *Leptospirae*. Sir A. CASTELLANI exhibited cultures of fungi isolated from cases of blastomycosis. Dr. W. H. DYE exhibited certain "famine foods" from East Africa—i.e., wild plants (chiefly tubers) containing much starch, but also much poison, and therefore not used for food except in times of dearth ; and then often used without the careful preparation requisite for removal of the poison, and sometimes with fatal effect in a whole family or community so as to simulate an outbreak of

infectious disease. Dr. H. M. HANSHELL and J. C. GILROY exhibited sections of varicose vein displaying the effects of injection of quinine hydrochloride in occluding the lumen of the vein through damage to the intima; eventually cure and obliteration of the varicosity result by complete absorption of the fibrosed vein: in the course of 78 cases (involving 1,000 injections) the only complication noted was localized dry gangrene of skin and subcutaneous tissue where the injections had been too large or too close together. Colonel S. P. JAMES exhibited preparations of malarial mosquitoes showing Ross's "black spores" in stomach-wall, thoracic muscles, and salivary glands. Dr. E. A. KELLERSBERGER sent a galaxy of photographs of interesting pathological phenomena from the Lomami District of Belgian Congo. Colonel Clayton LANE showed photomicrographs of curious effects of osmosis, cohesion, etc., observed in the manipulation of saline suspensions containing eggs of intestinal worms; also vegetable fibre, fish-bones, etc., having deceptive resemblance to specific worms, passed from the intestine. Dr. MANSON-BAHR demonstrated the effects of plasmochin on the gametocytes of *Plasmodium*; misshapen and disintegrating crescents; and even more striking effects upon gametocytes of *P. vivax*. Dr. A. ROBERTSON displayed under the microscope various stages in culture of *Trypanosoma cruzi*, and for comparison leptomonad forms from culture of *Leishmania donovani*. Dr. Dyce SHARP exhibited *Acanthocheilonema perstans* developing in *Culicoides austeni*. Dr. C. M. WENYON in behalf of Dr. NORRIE, of Calcutta, showed an exceptionally large (4x2x2 cm.) *Rhinosporidium*-polypus, and sections showing the parasite, *R. seeberi*, in all stages of development. Several demonstrations of laboratory apparatus were given.

A. A.

MISCELLANEOUS.

WELLINGTON (A. R.). **Panama. Health Conditions Past and Present. Report.**—46 pp. With 4 figs. 1927. Singapore: Fraser & Neave, Ltd., Printers.

An interesting account, by a health officer from the other end of the world, of present conditions in the Panama Canal Zone. The paper does not lend itself to summary, but a number of interesting and important points are quoted below.

"The actinic value of the sun's rays, as measured by the photographic meter, is only half that experienced in Malaya. Although the straw hat is the common head covering for all races, sunstroke is almost unknown and, when it does occur, the subject is almost always an alcoholic. It is not uncommon for white persons to go bare-headed for hours at a time and they suffer no ill effects."

"The Zone's area is four hundred and forty-eight square miles of which the Gatun Lake occupies nearly one half."

"The clay soil of the Alluvial flats is so dense, that spade cut drains preserve their formation and deteriorate very slowly from weathering. It is so non-porous that subsoil drains such as are used in Malaya cannot be employed. The so-called subsoil drains are really sub-rubble channels, for they consist of ditches having at their inverts concrete pipes, and filled to the surface with broken stone or rubble."

"During peace, the head of the Canal Zone is the Governor . . . He has autocratic powers and is responsible only to the President of the United States."

"The population has been concentrated in a few defined areas and the remainder of the Zone is devoid of humans."

"Anti-malaria control only extends to a radius of one mile beyond the limits of the Zone towns [7] and the cities of Panama and Colon."

"Filling being expensive is employed as little as possible."

"Oiling is done by sprays. The oil is ordinary liquid fuel, the same as is used in Malaya. To thin it to a spraying consistency, heat only is employed. At one time, thinning was done by mixing with the phenol larvicide manufactured locally. It was found that the soap of the larvicide interfered very materially with the spreading properties of the oil . . . It is only necessary to heat up to 70° C. The heating is done in steel kettles, where the oil is to be used."

"At one time a great deal of money was spent in keeping these edges [lakes and ponds] free from grass and reeds. Now they leave the vegetation alone and spray over it, or near it. It is said that the spreading property of the heated oil is such, that it finds its way between the stalks of grasses and reeds and kills the larvae harbouring there."

"Each lake is oiled once in ten days . . . One man rows the boat close to the shore while another sprays. The amount sprayed is insufficient to discolour the grasses, let alone kill them."

"Grass roots are not troublesome here, and they do not fill up the lumen of the pipes as so often happens in Malaya. Formerly, great use was made of earth channels which were oiled once in ten days; now they are going in more and more for permanent drainage."

"Permanent drains are of two kinds; concrete open channels and sub-rubble pipes."

"In spite of all that has been done in anti-mosquito work, the Canal Zone still continues to mosquito proof its houses."

"No private stables are allowed in the city [Colon]. There is one public stable, where stalls are rented by the horse owners. This institution is

kept carefully under control to prevent a fly nuisance developing. All manure is carted daily to the municipal compost pits, where it is stored and treated to kill any fly larvae which may be present and to prevent the deposit of eggs."

"The method of disposal [of refuse in Panama City] is dumping, followed by treatment until all danger of fly breeding is passed. There is an incinerator and it was used formerly. Once when it was out of action and dumping had to be resorted to, a determined effort was made to discover a method whereby the danger of fly propagation could be obviated. After a number of experiments had been tried a successful method was elaborated. It has everywhere been recognised that dumping would be ideal if fly-breeding could be eliminated, for it is cheaper than burning and it fills up low lying places and swamps without extra cost. The fly difficulty having been got over it was decided to close the incinerator and substitute dumping as a permanent measure.

"The Panama system is as follows :—

"The refuse is systematically dumped in a compact pile and the surfaces levelled. It is then given a good coating of warmed petroleum (liquid fuel) by means of a spray. The whole is then plastered with a layer of mud, several inches thick. Lastly the mud is sprayed with oil. Every day for eight days the mud covering is sprayed to kill any larvae which have escaped. By this time the heat of fermentation has killed all larvae in the pile and it is safe to leave it. In the daily refuse there is a considerable amount of grass matting such as is used in the East to pack goods. This is spread over the rubbish and sprayed. It acts as an extra protection and mud plastered on this makes a more durable covering. The sides of the pile have to be properly sloped and smoothed in order that the mud covering it shall endure. This is a very essential point for it is useless to treat the top and leave the sides open for the larvae to escape . . . It is recognised that the success of this method depends on Health Officer making a point of visiting daily. The dump is quite close to dwelling-houses and the method has been in use two years. There have been no complaints from the house occupiers, or from the hospitals, and a search for flies fails to find them."

"[The manure] is treated in exactly the same fashion as the garbage by being oiled and plastered with mud. The piling is repeated for 8 days." [The manure is eventually sold.]

"All houses are government property—private houses are not allowed in the Zone."

"Sanitary control is very strict and no nonsense is permitted."

J. F. C. H.

GIVEN (D. H. C.). **Health Organization on H.M. Naval Base, Singapore, and Results : with Comments on the Practice of Preventive Medicine seen during Tours in the Far East.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1928. Feb. 25. Vol. 21. No. 5. pp. 344–362. With 2 charts.

This is a full consideration of the problem stated in the title and does not lend itself to condensation. There is an interesting description of the Dutch system (inaugurated by SCHÜFFNER) of plantation sanitation. It is evident that the importance of attending to sanitary matters at the beginning of such undertakings as the Singapore Naval Base has been realized and that no repetition of the Port Swettenham catastrophe will be allowed to occur.

J. F. C. H.

MARSHALL (J. F.). **Principles and Practice of Mosquito Control. Being a Handbook to the British Mosquito Control Institute.**—pp. viii + 39. With 53 figs. & 1 map. Hayling Island, Hampshire. [2s. 6d.]

The booklet is a very useful guide to the subject treated. The term "water place" has been adopted for use in mosquito surveys in place of the cumbersome "potential breeding-place." [It would be helpful if the Institute would make a move with regard to the term paraffin. In this booklet the word seems to indicate lamp oil commonly called paraffin oil in Britain, kerosene in America, *pétrol* in French and *naphtha* in German. Paraffinum liquidum, lamp oil and motor spirit have all been employed in mosquito reduction and the rendering of these terms in various languages provides room for much confusion. SWELLENGREBEL and ROOK have suggested *vaseline liquide* for the first in French: the use of the terms liquid paraffin, kerosene and gasolene would help foreign readers of English to be sure what substance is meant.]

J. F. C. H.

MALAYAN MEDICAL JOURNAL. 1928. Mar. Vol. 3. No. 1. pp. 53-55.
—**Methods and Mechanism of Mosquito Control.**

From a study of the work of others and some fresh experiments now reported, the following conclusions are recorded:

- "1. The toxicity of oils increases with their volatility.
- "2. The volatile portions contain the principle which produces the primary lethal effects.
- "3. The lethal effects are produced by the penetration of the tracheal tissues by the volatile gases of the oil.
- "4. In the heavier oils the action is simply suffocation or plugging of the tracheae by mechanical means.
- "5. The water solubility of the oils appears to have no effect on their toxic properties.
- "6. A pine oil and crude oil mixture is more toxic than either oil separately.
- "7. One per cent. of castor oil in crude oil increases the spreading power of the oil film 25 times."

J. F. C. H.

DUNHAM (George C.). **Methods of reducing the Cost of Antimosquito Measures in the Control of Malaria.**—*Milit. Surgeon*. 1928. Jan. Vol. 62. No. 1. pp. 33-38. [Med. Field Service School, Carlisle Barracks, Pa.]

Dunham tackles the important problem of reducing the costs of malaria control. His own summary admirably states his conclusions.

"1. The cost of the antimosquito work in the control of malaria can be materially reduced if the control measures employed are based on the results of a properly conducted mosquito survey. The mosquito survey prevents the dispersion of effort, with the consequent waste of money and labor, which results from the employment of unguided and haphazard control procedures. The results of a mosquito survey indicate how a limited sum can be expended to the best advantage in the control of malaria carrying species of *Anopheles* and thus enhance the prospects of success in the control of malaria despite the financial restrictions.

" 2. The addition of from 20 to 25 per cent. of kerosene to waste motor oil will provide an effective oil larvicide at about one-fourth the cost of the crude oil and kerosene mixture.

" 3. A dust consisting of one part of Paris green in 100 parts of inert diluting dust, constitutes an effective larvicide for Anopheles larvae. In the control of Anopheles breeding places, the Paris green used to kill the larvae costs less than one-tenth as much as the crude oil-kerosene larvicide required to obtain the same results."

[Probably the last sentence is not *universally* true.]

J. F. C. H.

BOYD (J. E. M.). **Anti-Malarial Works and Improvements.**—*Jl. Roy. Army Med. Corps.* 1928. Apr. Vol. 50. No. 4. pp. 287-288.

This note arises from the success of the mosquito-proofing of soldiers' quarters reported by MUNRO (*ante*, p. 278) and referred to by RUTHERFORD (*Jl. R.A.M. Corps*, 1928, V. 50, No. 1, p. 76). The author says that a point needing "grave consideration" is "the elimination of the possibility of the execution of all schemes and works by local authorities, without reference to higher authority." From the context it appears that the authority contemplated is "sanitary experts at Simla." Examples are quoted of foolishly incomplete work—doors screened but not the fanlights over them, and so on. [It must be presumed that Major Boyd is right, but the civilian may be permitted some surprise that so simple a matter as the proper screening of soldiers' quarters cannot be properly attended to without guidance from the august "sanitary experts at Simla."]

J. F. C. H.

RUTHERFORD (N. J. C.). **Mosquito-Proofing of Barracks of British Troops in India.** [Correspondence.]—*Jl. Roy. Army Med. Corps.* 1928. Apr. Vol. 50. No. 4. pp. 316-318.

Colonel Rutherford brings additional evidence of improved health following the screening of soldiers' quarters. He quotes from the *Report on the Health of the Army* for 1926. In that report screening is described as an effective but expensive method of malaria prevention, and it is suggested that in proportion as removal of troops from malarious stations during the dangerous months is effectively carried out, so the need for screening will be diminished. Colonel Rutherford evidently has doubts [and the reviewer shares them] as to its ever being possible effectively to carry out such a scheme of "cold storage." The "exigencies of the service" are always liable, and even likely, to upset such a scheme by just that small amount which will wreck its efficacy.

It is suggested that a calculation of the costs of paludism to the Government of India would perhaps reconcile those in the seats of the mighty to some preventive expenditure on measures proved and admitted to be effective, although expensive.

J. F. C. H.

CAWSTON (F. G.). **Mosquito-Proof Gutterings.**—*Jl. Roy. Army Med. Corps.* 1927. Dec. Vol. 49. No. 6. p. 441.

The gutters ordinarily used on roofs are half-round and a fall is given by tilting one end higher than the other, when fixing. Cawston recommends that the gutter itself should contain the slope, its upper

edge being fixed horizontally. For this purpose six foot lengths of sheet iron can be cut out with converging borders, two inches wider at one end than at the other, and can then be bent so that their edges are parallel, giving a slope of one inch in every six feet.

J. F. C. H.

BROUGHTON-ALCOCK (W.). **Thatched Buildings—a Problem in Malaria Prevention.**—*Proc. Roy. Soc. Med.* 1928. Jan. Vol. 21. No. 3. pp. 462–464 (Sect. Trop. Dis. & Parasit. pp. 16–18).

This short paper is based on the belief that the dangerous anopheles are those found hanging about in houses and outbuildings. Thatched roofs and thatched walls provide additional sheltering crevices, encouraging mosquitoes to lurk within and making it more difficult to catch or kill them. The author advocates replacement of thatch by corrugated iron "painted with white refrigerating paint."

J. F. C. H.

VLASSOV (J.). **On the Question of Mutual Relation between Bats and Mosquitoes.**—*Rev. Microbiol. et Epidémiol.* 1927. Vol. 6. No. 2. English summary pp. 260–261. [In Russian pp. 174–175.].

The author reports the co-existence in Transcaspia of mosquitoes and great numbers of bats (*Myotis myotis omari* Thom. and *Minopterus schreibersii pallidus* Thom.). Despite the nightly issue from a cave of "scores of thousands" of these bats, mosquitoes are a great nuisance and three of the author's companions contracted malaria.

J. F. C. H.

BRUMPT (E.). **Rôle du poisson vivipare américain *Gambusia holbrooki*, dans la lutte contre le paludisme en Corse.** [**Rôle of *Gambusia holbrooki* in the Antimalarial Struggle in Corsica.**]—*C. R. Acad. Sci.* 1928. Mar. 26. Vol. 186. No. 13. pp. 909–911. With 1 text fig.

In a footnote the author says that under the name *Gambusia affinis* three species are often included, namely *G. affinis*, *G. patruelis* and *G. holbrooki*. It is upon the last that he reports. The fish came from Italy, having been bred from a consignment sent originally from U.S.A. to Barcelona. They thrive in canals, in which larval captures were reduced from some hundreds per square metre in 1926, to nil in 1927. As evidence that the fish were really responsible an interesting observation is noted. At a point of the canal where larvae were absent, five boats were tied up, four afloat but holding water and one half sunk. The four contained no fish but numerous anopheles and culex larvae; the sunken boat contained several gambusia, but no larvae whatever.

J. F. C. H.

LEGENDRE (J.). **Poissons larvivores de la Haute-Volta. Technique de l'emploi des poissons contre les maladies à moustiques.** [**Larvivorous Fish of the Upper Volta.**]—*Bull. Soc. Path. Exot.* 1927. June 8. Vol. 20. No. 6. pp. 476–480. [18 refs.]

Legendre refers to his former work in Madagascar, in which he combined economic pisciculture with mosquito reduction. He lays down certain principles for the use of fish in combating malaria.

(a) Use edible fish. Native races may be sceptical about the need for destroying larvae but appreciate an additional food supply.

(b) Use fish of large size, whose numerous fry are a good substitute for small adult fish.

(c) In rice fields and the like, use fish which spawn in the summer—the mosquito breeding season.

(d) In stocking with fish, it is useful to use fish about to spawn.

(e) Use fish which stand transport well, and which have been trapped or netted—not those caught by hook.

(f) It is often helpful to use a stock tank from which fish are distributed.

J. F. C. H.

SELLA (Massimo). I pesci larvifagi e l'esperimento di campagna antimalarica con le Gambusie a Rovigno d'Istria. [**Larviphage Fish and Antimalarial Control with Gambusia in the Territory of Rovigno, Istria.**—*Riv. di Malariologia*. 1927. Nov.-Dec. Vol. 6. No. 6. pp. 881-909. With 10 text figs. (1 map). [English summary pp. 1010-1011.]

Antimalaria experiments with *Gambusia* have been going on for 2 years, in an area of 300 square miles. The *Anopheles* ponds number more than 800, and are usually small. The fish stand frost well on a soft bottom in which they can burrow: they multiply rapidly within a few months, and a few individuals may live for two years; the young fish are the more voracious. There was a noticeable improvement in the number of primary cases of malaria in the first year after introduction of fish and still more in the second year. The results were as good in the area worked with *Gambusia* alone as in the area worked with *Gambusia* and with Paris green. The cost with *Gambusia* was about one-third the cost with Paris green. The foregoing is from the English summary.

A. Alcock.

MYERS (G. S.). [**An Analysis of the Genera of Neotropical Killifishes allied to *Rivulus*.**—*Ann. & Mag. Nat. Hist.* 1927. Jan. Vol. 19. No. 109. pp. 115-129. [Summarized in *Rev. Applied Entom.* 1927. June. Vol. 15. Ser. B. Pt. 6. p. 101.]

"This is a systematic account of the fish of the Neo-tropical region belonging to the tribe Rivulini of the Poeciliid sub-family Fundulinae, including descriptions of new genera and species. These fish destroy mosquito larvae."

J. F. C. H.

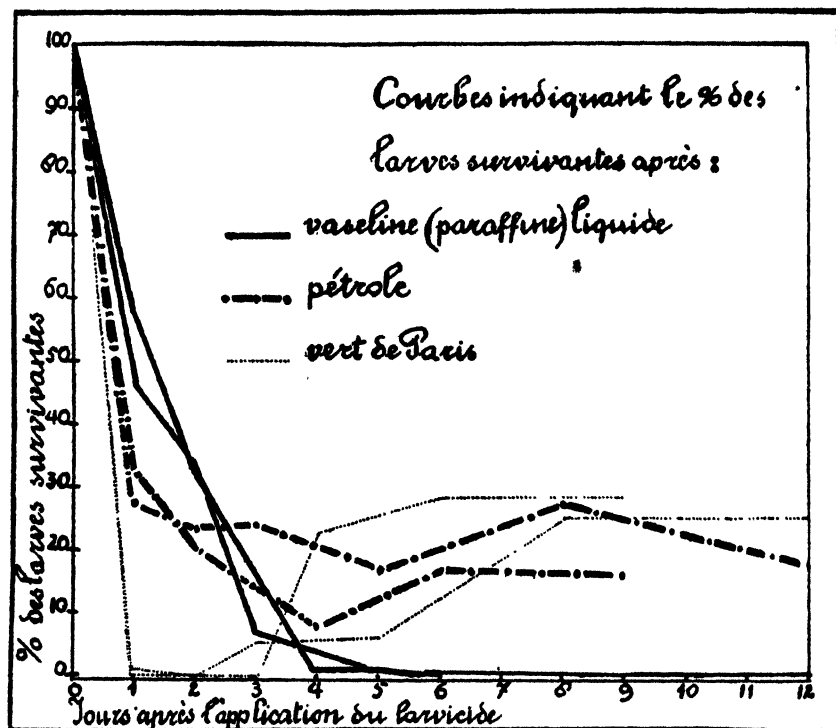
SWELLENGREBEL (N. H.) & DE ROOK. Effet comparé de quelques larvicides. [**Comparative Efficiency of Certain Larvicides.**—*Bull. Soc. Path. Exot.* 1928. Feb. 8. Vol. 21. No. 2. pp. 109-112. With 1 text fig.

The authors continue their comparisons of larvicides (see *Bulletin of Hygiene*. 1927. Vol. 2. p. 585). Some criticism has been aimed at their use of a smaller quantity of liquid paraffin than is employed when

kerosene is the agent applied, a proceeding held to be illogical since liquid paraffin kills larvae only by suffocation, while kerosene has a toxic action to supplement its asphyxiating properties.

Experiments have been made, using various agents, on different but comparable breeding areas and, in addition, the effects were noted when the amount of kerosene employed was equal to, double, and four times the quantity of liquid paraffin.

The results support the contention that a dosage of liquid paraffin adequate to destroy all larvae was insufficient when kerosene was the



Curves showing the percentage of larvae surviving after treatment with liquid paraffin, kerosene, and Paris green.

[Reproduced from the *Bulletin de la Société de Pathologie Exotique.*]

larvicide. In the first two days kerosene appeared to be superior, but at later stages it was less effective and lost its action before all larvae were killed.

The authors' explanation is that the vegetation in the places treated impeded the spread of both larvicides, but, while the effect of the liquid paraffin was only delayed, that of the kerosene was partially negated by volatilization taking place before the spread was complete.

The comparative results of the use of the two oils and Paris green are seen in the graph reproduced.

The authors have rejected the name *paraffine liquide* in favour of *vaseline liquide* to avoid the confusion which arises from the colloquial English use of the word paraffin. [See note in summary of MARSHALL, *ante*. p. 912.]

J. F. C. H.

BARBER (M. A.) & KOMP (W. H. W.). **Some Tests of the Larvicide "Stoxal".**—*Public Health Rep.* 1927. Aug. 5. Vol. 42. No. 31. pp. 1997-2004. [3 refs.]

ROUBAUD's work with "Stoxal" has been referred to in *Bulletin of Hygiene*. 1927. Vol. 2. p. 581. The present authors describe carefully conducted and controlled laboratory and field experiments to test the value of the new larvicide.

In field experiments against anopheles "Stoxal" distributed at 27 lb. per acre gave an efficiency of 85 per cent.; (this was the most favourable result obtained). Smaller amounts were much less efficient. Three pounds of Paris green in 300 lb. of road dust gave efficiency of nearly 100 per cent. Pure trioxymethylene (Merck)—the active substance of "Stoxal"—diluted with two volumes of dust and applied at a rate of 10.2 lb. of trioxymethylene per acre gave an efficiency of nearly 90 per cent.

The authors conclude that it is evident that the "minimum active dose" of $\frac{1}{4}$ lb. to $2\frac{1}{2}$ acres as described in the directions for the use of "Stoxal" cannot be expected to destroy a high percentage of larvae and "in the case of *Anopheles*, wherever a dust larvicide is indicated, Paris green is certainly far cheaper than stoxal." For culicines oil or fish will generally be more economical; even when this is not the case, commercial trioxymethylene diluted with some inexpensive dust, as originally recommended by ROUBAUD, will be much cheaper than and fully as efficient as "Stoxal."

J. F. C. H.

RYLES (C. S.) & MAJUMDER (B. C.). **The Use of Petrol as a Larvicide in Wells, Tanks and Similar Collections of Water used for Drinking or Domestic Purposes.**—*Malayan Med. Jl.* 1927. Dec. Vol. 2. No. 4. p. 144.

In preliminary laboratory experiments it was found that small quantities of gasoline, when dropped on a water surface, stupefied culicine larvae, but killed many of the anophelines. Stirring increased the efficacy of the gasoline. In the laboratory 2 drams to 95 sq. in. surface produced unfailing results. All signs of the gasoline had gone in 1 hour and all larvae (*Culex* and *Anopheles*) were dead.

Experiments were next made on wells and tanks with and without vegetation. Vegetation was killed by the gasoline and so were all kinds of mosquito larvae with rapidity and certainty when the application was made at a rate of 24 ounces per 80 sq. ft. at a cost of 15 cents. The convenient note is added that a whisky bottle holds 24 ounces. Stirring is recommended, but a spray may be used instead.

Many observers are stated to have confirmed the authors' finding that after 3 hours no trace of the gasoline is detectable by smell, taste or chemical examination.

It is suggested that wells be treated in the evening; by morning the water would show no trace of the application.

J. F. C. H.

MATHESON (Robert) & HINMAN (E. H.). **A New Larvicide for Mosquitoes.**—*Amer. Jl. Hyg.* 1928. Mar. Vol. 8. No. 2. pp. 293-296. [1 ref.] [New York State College of Agric., Cornell Univ., Ithaca, N.Y.]

Experiments here tabulated show that solutions of borax of not less than 1.5 gm. per litre of water are an efficient larvicide for mosquitoes. Such concentrations remain effective for a long time—at least six weeks.

A. Alcock.

CHALAM (B. S.). **The Possibility of "Paris Green" as an Anopheles Larvicide.**—*Indian Jl. Med. Res.* 1927. Apr. Vol. 14. No. 4. pp. 867-874. With 2 text figs. & 3 figs. on 1 plate. [4 refs.]

The author recounts his experiments with Paris green. To an area of about half-an-acre of brackish water free of vegetation or "floatage" and giving from 5 to 25 anopheles larvae at a dip, about 6½ ounces was applied; to another area of rather more than half an acre of brackish water with mangrove "floatage," yielding from 5 to 18 larvae at a dip, about 8 ounces; to about 133 square yards of ditch water with weedy selvedge, giving from 3 to 50 larvae at a dip, about 200 grains; to an iron cistern containing about 287 gallons of water and about 200 larvae, 5 grains; to a masonry garden-cistern of about 430 gallons capacity and harbouring about 150 larvae, 6 grains; as well as to a pond having an area of about an acre and a dense covering of green algae and containing large numbers of larvae, an unspecified quantity. In every case the anopheles larvae were killed off after the treatment with Paris green. The larvicide was diluted and was either thrown on the water by hand or applied by a bellows. Ordinary road dust, coke dust, sawdust, fine sand, or flour may be used as diluents; but they must be quite dry, or they sink and are useless. 1 part of Paris green was mixed with 100 parts of the diluent. The only precaution necessary in use is to keep to windward of the larvicide when applying it. No accidents occurred.

A. Alcock.

DALAL (P. A.) & MADON (E. E.). **A New Diluent for Paris Green.**—*Indian Med. Gaz.* 1927. Oct. Vol. 62. No. 10. pp. 554-555.

Tanks of various kinds form breeding places for anopheles in Bombay. For the application of Paris green, ordinary road dust was not very satisfactory because the disturbance of the water surface caused by wind or by the incoming flow made the dust and larvicide sink too quickly. Various experiments were made.

"(a) Cork powder was suitable but too expensive;

"(b) Sawdust had a tendency to sink after a short time and form a layer at the bottom which had to be cleaned often;

"(c) Fine road-dust sinks too quickly and does not withstand agitation or wind action;

"(d) Flue-dust—the very fine powder obtained after cleaning the boiler flues—was better in floating qualities, and worked quite satisfactorily in destroying larvae.

"But the best material for the purpose in view proved to be

"(e) French chalk. It forms a very thin even film on the surface, which lasts for about four days if the water is undisturbed as in the case of a closed tank, and almost refuses to be drowned by agitation."

The chalk, which is finely powdered magnesium silicate, can be bought in a crude form (steatite) in Indian bazaars under the name of *sangjiru* and when crushed and ground in a mortar is cheaper than the imported powder.

J. F. C. H.

- i. HERRMANN (O.), KOLOSSOW (J.) & LIPIN (N.). Ist Parisergrün ein besseres Anopheles-Larvizid als Naphtha oder Petroleum? [**Is Paris Green a Better Larvicide than Kerosene or Liquid Paraffin?**]
—*Arch. f. Schiffs- u. Trop.-Hyg.* 1928. Mar. Vol. 32. No. 3. pp. 140-143. [9 refs.]
- ii. DE ROOK (H.) & SWELLENGREBEL (N. H.). Bemerkung zu der Arbeit Hermanns, Kolossows und Lipins: Ist Parisergrün ein besseres Anopheles-Larvizid als Naphtha oder Petroleum, erschienen 1928 im Heft 3, Bd. 32, S. 140-143 dieser Zeitschrift.—*Ibid.* May. No. 5. p. 265.

i. The authors report experiments on the comparative value of liquid paraffin, kerosene and Paris green as larvicides and emphasize the limitations of Paris green, notably its failure to destroy the larvae of culicine mosquitoes and the eggs or pupae of anopheles, and the short duration of the effect of one application.

They suggest that the proper sphere of Paris green is provided by such conditions as render neither kerosene nor liquid paraffin suitable, instancing such waters as are required for drinking purposes or where fish life must be considered.

In the course of their argument the authors say: "That Paris green does not satisfy all workers is evident from the writings of Rook and SWELLENGREBEL, who give liquid paraffin preference over Paris green."

(ii) Rook and Swellengrebel admit that conditions in Holland led them to prefer the liquid paraffin except for big canals, but point out that in these, as stated in their paper, Paris green gave 83 per cent. reduction of larvae despite presence of rushes, while liquid paraffin gave no better figure than 65 per cent. [Probably no experienced worker would express an absolute preference for one larvicide or another, it being as true in mosquito destruction as elsewhere that circumstances alter cases.]

J. F. C. H.

- SCHUURMAN (C. J.) & HUININK (A. Schuurman-Ten Bokkel). Proefnemingen met Parijsch groen ter vernietiging van Anopheles-larven. [**Experiments with Paris Green to test its Effect as a Larvicide.**]
—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1928. Vol. 68. No. 2. pp. 280-292. [7 refs.] [Med. Lab., Weltevreden.]

These experiments were carried out in the medical laboratory in Weltevreden (Java) and in the field (fish ponds along the coast near Batavia). In the laboratory experiments the powder was mixed with cement, magnesia, acid clay, and pounded "red earth." This red earth can be had in any quantities, it is cheap and effective and so it is the diluting material for practical use in those parts. The dilution (1 per cent.) and quantities (10 cc. of the diluted material per sq. in.)

used, were the customary ones. It was found that the youngest instars were not killed. At any rate this is mentioned incidentally in the description of one experiment, although, in this case, it is not clear whether the young larvae, found after 38 hours, had hatched from ova present at the time of the dusting process, or whether they had survived this process in the shape of larvae. The larvicidal effect of Stoxal, diluted with magnesia, sand or acid clay, in quantities of 10 and 100 milligrammes per sq. m., proved unsatisfactory, especially when the test was made in a large tank: the mortality after 24 hours remaining under 40 per cent. (50 milligrammes per sq. m.), whereas Paris green, used in the same quantities and under the identical conditions, caused a mortality of 99 per cent.

The field experiments were carried out by applying the Paris green to the surface of one of the numerous littoral fish-ponds, containing brackish water and overgrown with floating and rooted weeds. It contained an average of 70 larvae per dip [species not stated, probably *A. rossi*, considering the time of the year: November 30–December 1], on a surface of 214 sq. m., requiring 2,568 litres of the mixture of red earth and 1 per cent. Paris green, distributed by a hand blower. The result after 24 hours showed 46 living larvae [size not stated], and 4 pupae in 160 dips. In one corner only, where the wind had failed to carry the powder in sufficient quantities, there still remained 293 larvae per dip.

With regard to costs, the author states that they are fl. 1.24 (about 2s. 1d.) for parisgreening 7,000 sq. m., against fl. 4.25 (7s. 1d.) for oiling the same surface (the author takes it that 1 litre of oil is sufficient for 100 sq. m.). To deal with the whole breeding area constituted by the Ludlowi fishponds in the vicinity of the town of Batavia, would require an annual expenditure of fl. 4,500 (£3,750) when using Paris green for 9 months (excepting the off-season with respect to Ludlowi, i.e., October–December).

N. H. Swellengrebel.

LISCHETTI (A. B.). [Experiencias sobre la acción de substancias tóxicas sobre mosquitos adultos.] [**Experiments on the Action of Toxic Substances on Adult Mosquitoes.**].—*Rev. Soc. ent. argent.* Buenos Aires. 1926. Dec. 31. Vol. 1. No. 2. pp. 29–32. [Summarized in *Rev. Applied Entom.* 1927. June. Vol. 15. Ser. B. Pt. 6. p. 112.]

"At short distances mosquitoes become aware of the presence of a honey-bait, and the females feed on the honey without waiting for an opportunity to suck blood. Poisoned females do not succeed in ovipositing. Mosquitoes, attracted by a caged guineapig, fed on poisoned honey smeared on the gauze of the cage."

J. F. C. H.

LISCHETTI (A. B.). [**The Poisoning of Adult Anophelines.**].—*Soc. Argentina de Patol. Regional del Norte; Segunda Réunion realizada en Salta.* 1926. pp. 228–242. [Summarized in *Rev. Applied Entom.* 1927. Apr. Vol. 15. Ser. B. Pt. 4. pp. 72–73.]

"Experiments with poison-baits against adult Anophelines have been made in Argentina, the material used being honey mixed with mercury bichloride, boric acid, arsenious anhydride, potassium arsenate, potassium arsenite or potassium cyanide. Potassium arsenite proved the most satisfactory, as potassium cyanide, though the most active, soon loses its toxicity."

J. F. C. H.

BALFOUR (Andrew). **An Address on the Education of Medical Officers for Service in the Tropics.** Delivered at the International Continuation Course of the League of Nations, Nov. 24th, 1927.—*Lancet*. 1928. Jan. 14 & 21. pp. 63-67; 117-122.

Two lectures given at the International Continuation Course of the League of Nations, the first headed tropical medicine, the second tropical hygiene. They will be widely read, and do not need detailed treatment here. It is interesting to find Dr. Balfour advocating a short course of study for students who have never been to the tropics, "during which essentials can be hammered into them."

"After some preliminary and general instruction, the idea is to take an important disease and to group round it, as it were, the teaching which is required for its full elucidation, considering it, therefore, from the purely clinical side, from the laboratory standpoint, and dealing with its relations to those sciences, haematology, protozoology, and entomology, with which it has close connexions."

"I am inclined to think that a couple of capable teachers, one on the clinical side, one on the laboratory side (and the latter, I admit, will not be easily found), with, of course, assistants and demonstrators, would be sufficient to ground the students properly, keeping, as I say, to essentials but not losing sight of the larger issues and forecasting, as it were, the longer and fuller course to which it is hoped the student will return after a sojourn in the tropics."

A. G. B.

NOCHT (Bernardt). **Present Position of Chemotherapy from the Clinical Standpoint.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1928. Feb. 25. Vol. 21. No. 5. pp. 397-408.

This was a lecture given at a Continuation Course in Public Health, organized by the League of Nations. It forms a useful review of its subject. Professor Nocht defines chemotherapy as "actiologic therapy with synthetic chemicals," which leaves outside the definition symptomatic therapy and natural pharmaceutical products, but he does not exclude quinine. He follows EHRLICH in distinguishing between organotropy and parasitotropy, but notes that parasitocidal action is rare, the usual effect being rather parasitotoxic, the impairment of motility or a prohibition of multiplication of the parasites.

He considers the mechanism of the action of quinine in malaria and finds that its effect is greater when the patients have developed some self immunizing power: "the effect of quinine is much better when administered after a certain number of attacks of fever." [Most authorities believe that the prospect of eradication of infection is greater the earlier quinine is given and greatest before the occurrence of relapse].

Another mode of action of chemotherapy is purely stimulant, as by stimulation of the reticulo-endothelial system; chemotherapeutic substances which act thus must be given very cautiously in small or very moderate dosage.

He divides the outstanding chemotherapeutic substances into six groups, thus:—

"(1) Aniline dye stuffs and their derivatives—methylene blue, gentian violet, trypan blue and trypanflavin, 'Bayer 205,' and other compounds.

"(2) Arsenic compounds—salvarsan and its derivatives, tryparsamide, stovarsol.

" (3) Antimony compounds—tartrated antimony, stibenyl, stibosan, antimosan.

" (4) Metallic compounds—gold, silver, mercury, bismuth, and copper compounds.

" (5) Quinine and its derivatives and relations.

" (6) Different curatives, for instance, the derivatives of chaulmoogra oil, organic iodine, compounds like yatren and others."

Emetine, he says, cannot be called a true chemotherapeutic compound.

In the consideration of the chemotherapy of bacterial infections he distinguishes septic infections, pneumococcal infections and others. In the third group come the metallic therapy of tuberculosis, the treatment of leprosy with chaulmoogra oils and gold, and that of venereal granuloma with antimony compounds. He thinks that gold compounds act as general stimulants rather than directly.

He sums up the chemotherapy of bacterial infections by saying that the only example of really quick and reliable curative influence is that of antimony on venereal granuloma, but whether the capsulated micro-organism which is found " is a real bacterium is not quite certain."

The spirochaetal and trypanosomal infections are the classical territory of chemotherapy, the best remedies for sleeping sickness at present being Bayer 205, tryparsamide and antimony. Of Bayer 205 he writes:—

" Unfortunately the best method of application of ' Bayer 205 ' in man seems not to be generally known abroad. It must not be given at too long intervals, as for instance only once in a week. We have had excellent results in all cases treated in Hamburg by beginning with daily doses of 1 g. for about four or five days and then continuing with weekly doses. In cattle infections with trypanosomes, the results of ' Bayer 205 ' are not yet definite in Africa, but in South America it has given excellent results against mal de Caderas, and in Russia—Kirgise [sic] Steppes—against a camel disease—surra. Thousands of camels have been cured. The Russian authorities report that it is due entirely to ' Bayer 205 ' that camels have lived and bred in the Kirgise Steppes and have been preserved."

Tryparsamide was originally prepared and tested by EHRlich.* Antimony tartrate was first used by PLIMMER and J. D. THOMSON† (1907). Finally Dr. Nocht speaks very highly of yatren—for amoebic dysentery in every phase, for chronic bacillary dysentery and for chronic ulcerative colitis.

A. G. B.

CLEVELAND (L. R.). **Some Problems which may be studied by Oxygenation.**—*Science*. 1926. Feb. 5. Vol. 63. No. 1623. pp. 168–170. [Med. School, Harvard Univ., Boston, Mass.]

The author's studies on the toxic effect of oxygen pressure upon protozoa, bacteria, moulds, and yeasts lead him here to speculate on the multifarious scientific and economic possibilities of the application of this process of oxygenation. Among those already tried by him is the freeing of insects from their protozoon and other parasites and symbiotes for experimental investigations (*cf.* this *Bulletin*, Vol. 22,

* Professor NOCHT has withdrawn this statement. Tryparsamide was originally prepared at the Rockefeller Institute and there tested (see this *Bulletin*, Vol. 15, p. 390).

† Not PLIMMER and BRADFORD, as is stated, probably by a slip, in the text.

pp. 835, 836); this is applicable to the solution of many problems of general biological importance. Among economic possibilities he suggests the freeing of useful insects, fishes, and plants from their parasites; determining the nature of ambiguous viruses of plants, and the rôle of insect transmitters of disease; killing protozoa for immunization purposes; sterilizing culture media; destroying insects in grain and nuts, and the preservation and storage of liquids.

A. Alcock.

COOPER (G. F.). **Infant Feeding in the Tropics.**—*U.S. Nav. Med. Bull.* 1928. Jan. Vol. 26. No. 1. pp. 79-81.

The author after 10 years of observation finds that in Haiti, where it is not possible to obtain fresh cow's milk of good quality, babies do as well, or better, on condensed milk. He gives detailed instructions for condensed milk feedings; it is made up with oatmeal water and supplemented by orange juice and cod-liver oil.

A. G. B.

MEGAW (J. W. D.) & MULLICK (M. N.). **Some Laboratory Findings and their Significance.**—*Indian Med. Gaz.* 1928. Mar. Vol. 63. No. 3. pp. 113-117.

The analysis is made of laboratory findings in 400 unselected patients, admitted to the hospital of the Calcutta School of Tropical Medicine and Hygiene. As all patients are subjected to these routine examinations, whatever may be the disease they are suffering from, the series forms an excellent control, which would be capable of application at any time to results obtained in a particular disease. It is one of the great difficulties in dealing with hospital statistics that it is necessary to know what occurs in the class of patients which attends the hospital, as well as the general population, if the significance of special findings is to be established. The authors emphasize the fact that the labour involved in carrying out laboratory investigation as a uniform routine is repaid by the additional light which is sometimes thrown upon the clinical aspects of a case. And yet they would not elevate the laboratory conclusion into a final judgment. That is reserved for the clinician, preferably in actual consultation with the laboratory expert. The present series gave the results that:—

(1) A positive agglutination reaction with the Flexner or Shiga bacillus is suggestive of the previous occurrence of a dysentery infection.

(2) A positive finding in low dilution in dysentery cannot be accepted as meaning that the attack is due to the bacillus which is agglutinated.

(3) A negative finding does not exclude dysentery infection.

(4) Agglutination tests cannot be relied on for the discovery of carriers in dysentery.

(5) Positive agglutination reaction to the enteric group in fairly high dilutions is so common, that it is of little value as evidence of the existence of the disease in Bengal, even in persons who have never been inoculated.

(6) The findings for the enteric group are very suggestive of the existence of widespread infection of the population in childhood.

(7) Only 7 per cent. of patients showed cysts of *Entamoeba histolytica*.

(8) Wassermann reactions were, strongly positive 6.1 per cent., moderately positive 16.4 per cent., doubtful 8.7 per cent. and negative 68.7 per cent.

(9) *Microfilaria bancrofti* infection was found in 6.75 per cent.

(10) Hookworm ova showed in the stools in about 27.6 per cent. of unselected cases in Calcutta.

W. F. Harvey.

ARATHOON. Etude sur la morbidité de 10e régiment de tirailleurs sénégalaïs. (Extrait du rapport annuel pour 1926). [**Disease Incidence in the 10th Regiment of Senegalese: from the Report for 1926.**—*Ann. de Méd. et de Pharm. Colon.* 1927. Oct.–Nov.–Dec. Vol. 25. No. 4. pp. 458–464.]

In February, 1926, some months after the return to Tunis of a battalion sent to Morocco, some six natives and three Europeans attended hospital for ulcers, ranging from the diameter of a 50 centime piece to that of a two franc piece, purulent, with irregular, granular face and steep edges, with base indurated and margin inflamed; they were situated on the back of the hand and forearm, face (forehead, lip, ear) and in one instance the leg. Most of the patients had more than one. Afterwards other cases were seen, in all 5 Europeans and 14 natives. Scrapings of the ulcers were examined under the microscope and in 5 instances *Leishmania* were found; the author believes all the cases to have been dermal leishmaniasis. All came from three companies which had been stationed for a long time at Ain Maatouf, 80 kilometres east of Fez, already known to be a focus of this infection. Various methods of treatment were followed and all resulted in cure.

Two cases of bilharziasis were admitted to hospital, and examination at the Pasteur Institute revealed the fact that of one company 30 per cent. were infected [species or site not mentioned]. This is important, because *bullinus* molluscs are found in at least one part of Tunis. Strict measures will be necessary to prevent the establishment of bilharziasis in Tunis.

A. G. B.

GORDON (G. A. C.). **The Health of the European Child in Singapore and Malaya.**—*Jl. Trop. Med. & Hyg.* 1927. Dec. 15. Vol. 30. No. 24. pp. 313–319. [13 refs.] Also in *Malayan Med. Jl.* 1928. Mar. Vol. 3. No. 1. pp. 32–40. [13 refs.]

The conclusion of this interesting contribution to a subject of increasing importance is that European children could be kept longer in Malaya than is now the custom, to the age of nine or, with hill-stations and "leaves" to Europe, to the age of puberty without physical or mental deterioration. Singapore has a humidity constantly between 80 and 90 per cent., a heavy and evenly distributed rainfall and a mean temperature of 80° F. At present most children are sent to England at the age of 5, but the author notes that there are a number of families of European stock, born and brought up in the tropics, who though not so robust or virile as the European immigrant, compare favourably with the indigenous population. He discusses the physical and mental development, moral and educational difficulties and points of infant and child welfare in the tropics. Unsweetened condensed milk

is regarded as a valuable food for children and the consumption of desiccated milk rises steadily; fresh cow's milk is not considered a suitable food for children in this country. Dietary, clothing and exercise are considered—in general European children do not get sufficient exercise and are kept too much in the house—and, lastly, common debilitating ailments and their prevention.

A. G. B.

HUPPENBAUER (C. B.). Beitrag zur Frage der Tropendienstfähigkeit. [**Fitness for Tropical Service.**]—*Abhandl. a. d. Gebiet d. Auslandskunde. Hamburg Univ.* 1927. Vol. 26. (D., Med. & Vet. Vol. 2.) [Festschrift NOCHT.] pp. 210–219. [8 refs.]

In this brochure the author deals generally with the question of the examination of candidates for service in tropical countries, pointing out the necessity for a more detailed case history and examination than for life insurance. Each candidate should be considered in reference to the particular country to which he is going and the environment which he will there meet. The teeth, the organs of the special senses and in women the generative organs must receive great attention, and "anyone who does not care for his skin in a proper manner is not fit to go to a hot country." The "Quinine Test" is considered essential, *i.e.*, a candidate must be shown to be able to take full doses of quinine before leaving Europe. [This paper contains no new ideas.]

H. S. Stannus.

RUBINSTEIN (P. L.). Ueber noch unbekannte Funktionen des retikulo-endothelialen Systems. II. Der Einfluss des retikulo-endothelialen Systems auf den prophylaktischen Effekt des Stovarsolans Spirochäten gegenüber. [**On Some Hitherto Unrecognized Properties of the R.-E. System. II. The Influence of the R.-E. System on the Prophylactic Effect of Stovarsolan in Spirochaete Infections.**]—*Ztschr. f. Immunitätsf. u. Experim. Therap.* 1928. Mar. 6. Vol. 55. No. 1–2. pp. 107–117. With 2 text figs. [6 refs.] [Microb. Research Inst., Education Commissariat, R.S.F.S.R., Moscow.]

Rubinstein has investigated the influence of (1) splenectomy and (2) splenectomy and blockade, on the prophylactic action of stovarsolan in experimental recurrent infection of mice. The prophylactic method of test was rendered necessary owing to the desirability of excluding complicating factors arising from antibody-development in the ordinary therapeutic test. The procedure employed was usually as follows: The spleen was removed 24 hours before infection with *S. obermeieri*. Three hours after infection, stovarsolan was given *per os* and also on the two following days. The results are given *in extenso* in five tables, but they may be shortly summarized thus:

				Percentage sterilized.	Percentage mortality
Mice with intact R.E.	...	...	...	92	0
"Blockaded" mice	...	...	...	57.5	12.7
Splenectomized mice	...	...	...	0	78.4
Splenectomized and blockaded mice	...	...	...	0	73.5

The author concludes that the prophylactic effect of the remedy depends on the intactness of the R.E. system. If this is interfered with in any way the sterilization rate falls and the case mortality rises.

J. C. G. Ledingham.

RUBINSTEIN (P. L.). Ueber ein bisher noch unbekannte Funktion des retikulo-endothelialen Systems. III. Die Abhängigkeit der Chemotherapie und Chemoprophylaxe von der Blockierung des retikulo-endothelialen Apparates. [**The Influence of Blockade of the R.E. System on Chemotherapeutic Efficiency.**]—*Ztschr. f. Immunitätsf. u. Experim. Therap.* 1928. July 20. Vol. 57. No. 1-2. pp. 107-129. [7 refs.] [Microbiol. Research Inst., Education Commissariat R.S.F.S.R., Moscow]

This paper contains a further contribution from the Moscow Laboratory directed by Prof. KRITSCHESKI on the influence exerted by interferences with the R.-E. system on the efficacy of chemotherapeutic substances. Mice were infected with trypanosomes (*T. equiperdum* and *T. suaru*) and the chemicals tested were atoxyl, germanin, trypanrot, trypanosan, antimony tartrate, and trypanflavin. The main object of the new series of experiments was to ascertain the influence of blockade alone (5 per cent. sol. of sugar of iron) as contrasted with that of splenectomy alone and of splenectomy *plus* blockade. The experimental results are displayed in eleven tables and in each experiment normal control mice were tested in parallel. In a few of the experiments the drugs employed did not prevent the appearance of trypanosomes in the blood and death of the mice within the period of observation, generally one month, but, as a rule, the mortality from trypanosome infection of the treated splenectomized animals, and of those which were both splenectomized and blocked, was in the neighbourhood of 90 per cent. If one may legitimately sum the results of all the eleven experiments in order to give the reader an indication of the comparative mortality statistics in all four series, they work out as follows:—Splenectomized animals: No. used 73, mortality 92 per cent. Splenectomized and blocked animals: No. used 82, mortality 94 per cent. Blocked animals: No. used 92, mortality 55 per cent. Normal animals: No. used 90, mortality 41 per cent. The general result is clear that blockade alone interferes but slightly with the efficacy of the drug, whereas splenectomy renders the drug practically ineffective. The addition of blockade to splenectomy makes little difference.

J. C. G. Ledingham.

MACKERRAS (I. M.). **Tick Paralysis in Man in Australia.**—*Rep. of Director-General of Pub. Health New South Wales for Year 1926.* pp. 168-169. [12 refs.]

This is a resumé of the subject of tick-paralysis largely informed by the discoveries of Clunies Ross, who furnished the experimental proof that in animals the disease is caused by the toxic saliva of the adult female of *Ixodes holocyclus*, and by her only when, as she approaches a state of repletion, her salivary glands become grossly enlarged and their secretions fully toxic. [The work of Clunies Ross has already been noticed in this *Bulletin*, Vol. 24, p. 489]. It is probable that in man

also the adult female of *Ixodes holocyclus* is always the causative agent ; all the recorded cases of tick-paralysis fall within the limits of its distribution. No age seems to be exempt, but the disease is more frequent and more serious in children than in adults. The clinical symptoms are those of a progressive motor paralysis, of very varying intensity, ending within a few days either in complete recovery or in death, death in many cases being by paralysis of respiration. The symptoms are here described in great detail. Clunies Ross's evidence suggests that the tick-venom has a special affinity for the motor cells of the spinal cord and the cranial nerve ganglia. Beyond removal of the tick no specific treatment seems to have been considered.

A. Alcock.

VON BÄNSZKY (L.) & KREMER (W.). Allergische Reaktion bei Milbenüberempfindlichkeit.—*Ztschr. f. Immunitätsf. u. Experim. Therap.* 1928. Mar. 6. Vol. 55. No. 1-2. pp. 102-106. [3 refs.] [Pharmaco-Therap. Inst., Univ., Leyden.] [v. this *Bulletin*, Vol. 20, p. 473.]

BOSE (J. P.). A Simplified Method for Estimation of Sugar in the Blood.—*Indian Med. Gaz.* 1928. Feb. Vol. 63. No. 2. pp. 72-76. With 1 coloured plate.

FEILER (Marie). Ueber die Chininwirkung auf die Tierzelle. I. Mitteilung.—*Arch. f. Protistenkunde.* 1927. Nov. 4. Vol. 59. No. 3. pp. 562-581. With 9 text figs. [37 refs.] [Zool. Inst., German Univ., Prague.]

RICOU (J. D.). Contribution à l'étude de la vaccination préopératoire.—*Bull. Soc. Path. Exot.* 1928. Mar. 14. Vol. 21. No. 3. pp. 260-266. [Main Hosp., Dakar.]

RUSO. Etude sur les conditions d'organisation d'un service hydrologique dans les colonies et pays de protectorat et en particulier au Maroc.—*Rev. Méd. et Hyg. Trop.* 1928. Mar.-Apr. Vol. 20. No. 2. pp. 41-44.

TILMANT (Jules). Les dispensaires ruraux de la Province Orientale (Congo).—*Bruxelles-Méd.* 1928. Apr. 15. Vol. 8. No. 24. pp. dcclvii-dcclxiii.

REVIEWS AND NOTICES.

BRAHMACHARI (Upendranath). [K.-I.-H. (Gold), Rai Bahadur, M.A., M.D., Ph.D., etc.] **A Treatise on Kala Azar.** [Translated from the Author's Treatise on Kala-Azar in German in Professor Dr. Carl Mense's *Handbuch der Tropenkrankheiten*, Vol. IV, 1926, thoroughly revised and considerably enlarged.]—pp. xv+252. With 39 text figs., frontispiece & 12 plates (7 coloured). 1928. London: John Bale, Sons & Danielsson, Ltd., 83-91, Great Titchfield Street, W. 1. [21s.]

The Indian Research Fund Association is a very important agent for the development of medical research in India. In recent years, amongst its many activities, it has inaugurated investigations on the transmission and specific treatment of kala azar. Research on the latter aspect was conducted for the Association by Dr. Brahmachari at the Campbell Hospital, Calcutta, where he worked for many years. The combination of clinical and laboratory facilities in this well-managed hospital afforded unique conditions for research on the treatment of kala azar, and the author made full use of his opportunities. The results of his researches are embodied in the present volume, which is based upon the chapter written by Brahmachari for the fourth volume of Mense's *Handbuch der Tropenkrankheiten* published in 1926.

The book is divided into 17 chapters with 3 appendices. Chapter I deals with the history, geographical distribution and epidemiology of kala azar. Then follow three chapters on etiology and inoculation experiments. The next two are concerned with the transmission of the disease. In chapter VII the relation of canine to human leishmaniasis is discussed. The next chapter is devoted to herpetomoniasis and leishmaniasis. Thereafter in chapters IX to XV the symptomatology, complications, prognosis, diagnosis, pathology and treatment of kala azar are considered in detail. Chapter XVI deals with dermal leishmaniasis. Finally, in chapter XVII the prophylaxis of the disease in India and the Mediterranean countries is discussed. There is a very full bibliography with about 2,000 references and an index of authors and subjects.

The author considers that endemicity forms a special feature of kala azar and states that DONOVAN doubted the possibility of an epidemic outburst. Brahmachari concluded from clinical and statistical evidence that the old Burdwan fever (1854-1875) was mostly of malarial origin. ROGERS, on the other hand, held that this fever was an epidemic of kala azar. The author sees no reason to separate the Indian from the Mediterranean leishmaniasis.

Recent work on the rôle of the sandfly in the transmission of kala azar is clearly stated. He considers that the discovery of *Phlebotomous argen-tipes* in the city of Bombay, from which place no undoubted case of kala azar has been reported, goes against the possibility of the transmission of kala azar by this sandfly.

As would be expected, the *pièce de résistance* of the book is the chapter on treatment. A full history of the discovery by the author of urea stibamine is given. This drug has been now largely used in India for the treatment of kala azar and has proved its value for the purpose. The only drawback to its use on a large scale is its comparatively high cost, but this may be reduced in time. In discussing treatment more stress might have been laid on the importance of dealing, in the first place, with other parasites, which the patient may harbour, for example, hookworm, etc. Possibly some of the "resistant" cases might yield more readily to specific treatment if this point was attended to.

A good account of the important skin lesion called "dermal leishmanoid" is given, well illustrated with coloured plates and microphotographs.

In the appendices laboratory methods employed in the diagnosis of kala azar are given in full detail.

A few misprints have been noted: thus, on page 119, the dose of urea stibamine is stated to be 0.05 to 1 gm.; the latter figure should be 0.1 gm.; and, on page 132, this error is repeated. The word "ancylostoma" is spelt throughout with a "k," which is not the present accepted spelling. These misprints should be corrected in future editions.

The author and the publishers are to be congratulated on having produced a clearly written, well illustrated and valuable monograph on a very important disease. The book can be confidently recommended to all medical men in the tropics and to others interested in the subject of kala azar in various parts of the world.

E. D. W. Greig.

ZIEMANN (Hans) [a.o. Professor an der Universität Berlin. Früher Med. Referent in Kamerun.] *Gesundheits-Ratgeber für wärmere Zonen. [Guide to Health in Hot Climates.]* 6th Edition, Revised and Enlarged.—90 pp. With 19 figs. & 7 charts. 1928. Berlin: Dietrich Reimer (Ernst Vohsen). [3 Rm.]

This is a small book of information and advice for those who dwell and work in the tropics. It has been written for the use of missionaries, planters and travellers who may find themselves in out of the way places. As stated by the author in his Preface, it is not intended to take the place of skilled medical attendance, but to guide and aid in illness when skilled help is not available. It deals also with the prevention of disease and the care of the body in tropical regions. Housing, diet, clothing, the value of pure water, etc., receive careful notice. Then follow special sections on tropical diseases; brief and condensed, but accurate so far as the plan of the book goes. The author has put as much information as possible into 90 pages. The book also contains a few useful illustrations, especially in connection with malaria where the eggs, larva and imago of *Culex* and *Anopheles* are depicted and the reader is warned against mosquitoes with spotted wings. Each short section contains paragraphs on symptoms, causes and treatment. At the end of the book are found surgical and medical outfits for travellers and small families. This "Guide" has now reached the sixth edition and is to be translated into English and Italian, facts which bear witness to its usefulness.

J. H. Tull Walsh.

RIVERS (Thomas M.) [Edited by.] **Filterable Viruses.** By Harold L. AMOSS, Jacques J. BRONFENBRENNER, Alexis CARREL, Edmund V. COWDRY, Rudolf W. GLASER, Ernest W. GOODPASTURE, Louis O. KUNKEL, Stuart MUDD, Peter K. OLITSKY, Thomas M. RIVERS. —pp. ix+428. With 26 figs. & 15 plates (1 coloured). 1928. London: Baillière, Tindall & Cox, 8, Henrietta Street, Covent Garden, W.C. 2. [34s.]

This volume is a symposium, and has the virtues and limitations of its type. As the editor expressly states, no attempt has been made to produce an encyclopaedia; and the student who requires a Baedeker to the filtrable viruses will find inconvenient gaps. But, if he reads the ten chapters, noting the divergencies of opinion and the different methods of approach, and trying to differentiate between what is certainly known and what is surmised with a greater or less degree of probability, he will gain an insight into the present position of the whole problem, which will well repay his trouble.

The introductory chapter, by the editor, is a reprint, in a slightly altered form, of a paper which has already been published elsewhere, and was reviewed in an earlier number of the *Bulletin of Hygiene* (1928. Vol. 3. p. 481)

The second chapter, by Dr. Mudd, on filters and filtration, deals with certain of the factors which may influence the passage of small particles through filter-candles or through collodion membranes. It forms a valuable introduction to the chapters which follow, and renders less surprising the conflicting evidence on matters of fact, with which every student of the literature must be familiar. The concluding paragraph of this chapter may be commended to all workers in this field :

"In the studies on the filterability of active agents there should be recorded, in addition to full biological details, any preliminary manipulation of the filter or of the material to be filtered ; the type and size of filter used ; whether filter is new or old, and, if used, for what purpose ; air-pressure test of filter ; content and dilution of fluid to be filtered, including active agent, control organisms, colloids, electrolytes, and approximate reaction ; filtration pressure ; volume of filtrate ; the stage in the filtration process at which specimens are collected for tests ; media and animals into which specimens of the filtrate are inoculated."

The third chapter, by Dr. Carrel, deals with tissue cultures in the study of viruses.

In the fourth chapter Dr. Cowdry discusses the problem of intercellular pathology in virus diseases and favours the view that the various inclusion bodies, which have been described, are cellular products rather than modified forms of the filtrable virus itself.

There follow five chapters on the virus diseases affecting particular host-species, illustrated in each case by a particular example : in man by poliomyelitis, described by Dr. Amoss ; in mammals by foot-and-mouth disease and vesicular stomatitis, described by Dr. Olitsky ; in birds by fowl-pox, described by Dr. Goodpasture ; in insects by sacbrood of honey-bees and polyhedral diseases, described by Dr. Glaser ; and in plants by the various mosaic diseases, described by Dr. Kunkel.

Finally Dr. Bronfenbrenner contributes a stimulating and informative chapter on the bacteriophage, which, as he rightly claims, cannot be excluded from a general survey of the filtrable viruses, whatever view may be taken as to its actual nature.

Each of the contributors has first-hand experience of the subject with which he deals, and each has himself added to our stock of knowledge.

The chapters on the virus diseases of insects and of plants will be particularly valuable to medical bacteriologists, whose experience lies mainly with man and with domesticated animals. The rôle played by insects in the spread of mosaic disease, and the striking specificity of some of these vectors, is a beautiful example of the dependence of natural infection on the principles of ecology ; and the absence of acquired resistance in plants offers a provocative problem to the immunologist.

The bibliography attached to each chapter will point the way for any reader who desires to extend his enquiries in any particular direction.

[Abridged from review by Prof. W. W. C. TOPLEY in *Bulletin of Hygiene*, 1928. Oct. Vol. 3, p. 906.]

BUREAU OF HYGIENE AND TROPICAL DISEASES

TROPICAL DISEASES BULLETIN.

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[No. 12.]

HELMINTHIASIS.

LLODT. Contribution à l'étude de l'helminthiase intestinale en A.E.F. La répartition du parasitisme chez les travailleurs du Congo-Océan et la cure de déparasitisation par le tétrachlorure de carbone. [**Helminthiasis in French Equatorial Africa. Distribution of Parasites in Railway Labourers.**—*Bull. Soc. Path. Exot.* 1927. Oct. 12. Vol. 20. No. 8. pp. 743-748. [6 refs.]

An examination of 1,720 stools of labourers on the Congo-Ocean Railway was made in August 1927, as a means of sampling the population of French Equatorial Africa and of ascertaining the infestation index. It was also thought that foci of severe infections might be revealed. The survey failed in the latter respect. As regards the various kinds of infections it is noted that the single case of *S. mansoni* came from the Tchad region. Only ten cases of *Taenia* and 24 of *Strongyloides* occurred. The common infections were hookworm, whipworm and ascaris. Hookworm occurred in 66.8 per cent. from Central Congo, 66.1 per cent. from Ubangi and 55.1 per cent. from the Tchad. Ascariasis was also very prevalent. Central Congo gave 59.6 per cent., Ubangi 47.7 per cent. and Tchad 42.5 per cent. Whipworm was found in 53.5 per cent. of those from Central Congo, 29 per cent. from Ubangi and 33.4 per cent. from Tchad. The specific action of carbon tetrachloride against the hookworm in cases of mixed infections is commented upon.

R. T. Leiper.

CAFFREY (P. J.). **A Helminthic Survey of Native Administration Prisoners in the Gaol at Maiduguri, Bornu Province.**—*West African Med. Jl.* 1928. Apr. Vol. 1. No. 4. p. 68.

460 patients were examined for helminths especially for ankylostomes, taenia and bilharzia. The method followed was to macerate a small quantity of faeces on a slide with Gram's iodine and to search 150 fields under a one-third objective and a No. 8 ocular [maker?]. This gave 67 cases of hookworm, 4 of *Schistosoma mansoni* and 17 *Taenia*. 20 cases of *S. haematobium* were found by first testing for albumen and then slowly centrifuging and examining the deposit on a slide.

R. T. L.

- DAUBNEY (R.) & CARMAN (J. A.). **Helminthic Infestations of Natives in the Kenya Highlands.**—*Parasitology*. 1928. July. Vol. 20. No. 2. pp. 185–206. [22 refs.] [Division of Veter. Research, & Med. Dept., Kenya Colony.]

At the Government Reformatories in the Highlands of Kenya there is a widespread infestation with *Taenia saginata* and a very light though frequent infection with hookworm. 50 per cent. of the inmates have tapeworm and 57.9 per cent. have hookworm. Carbon tetrachloride combined with oil of chenopodium was found to be a safe and efficient anthelmintic. A series of statistics show the influence of infestations and treatment on the physical conditions of the boys examined.

R. T. L.

- ESPIÉ (A.). Parasitisme intestinal des adultes de l'île de Djerba. [**Intestinal Parasites of Adults in the Isle of Djerba, Tunis.**]—*Arch. Inst. Pasteur de Tunis*. 1928. June. Vol. 17. No. 2. pp. 163–166.

Faeces from two hundred adults belonging to various villages of Djerba were examined in an enquiry into the endemic foci for ankylostomiasis in Southern Tunis. In addition to *Ascaris*, *Trichocephalus* and *Oxyuris*, a species of *Trichostrongylus* and *Hymenolepis nana* were found. A single carrier of hookworm was noted.

R. T. L.

- CHANDLER (Asa C.). **The Prevalence and Epidemiology of Hookworm and Other Helminthic Infections in India. Part XII. General Summary and Conclusions.**—*Indian J. Med. Res.* 1928. Jan. Vol. 15. No. 3. pp. 695–744. With 10 graphs & 3 maps (1 folding) [30 refs.]

This summary concludes eleven important contributions which have been noted from time to time in this *Bulletin*. As the methods of investigation changed during the progress of the work, an account of them is again given. The enormous variation in the climatic conditions of India is the keynote to the very unequal distribution of hookworm. Occupation does not play so important a part in the epidemiology of hookworm as appears to be the case in China. The vast majority of worms are acquired whilst standing on infested ground during the act of defaecation. Footgear has undoubtedly a controlling influence, but in India shoes are rarely worn in those regions where hookworm is prevalent. Domestic animals eat hookworm faeces, but their rôle in the spread of the infection is not clearly determined. It would appear that the eggs and embryos fail to pass through the gut of cattle and buffaloes alive. In mines, cockroaches eat faeces and destroy hookworm eggs. But the dung beetles provide suitable conditions for their development. Soil also plays an influential part. Very light sandy and gravelly or light sandy loam soils are unfavourable for hookworms where the rainfall is small and irregular in distribution. Heavy clay soil as in the Assam Hills and black cotton soil in the Central provinces and Central India in the Deccan, Hyderabad, Madras and Mysore are also unfavourable media. Artificial irrigation has little effect as the populace resort to the dry spots for defaecation. In India sex influences little. *Necator americanus* is the predominant hookworm

in Southern India. Northwards the *Ancylostoma duodenale* increases in incidence. The author quotes JOLLY that in Burma 5 to 6 per cent. of the worms harboured are *A. duodenale* and no less than 3·8 per cent. are *A. braziliense*. As regards grades of infection the author concludes that less than 100 eggs per gram is practically negligible from both a clinical and an epidemiological standpoint. 100 to 500 eggs per gram is clinically negligible, but epidemiologically important. With 2,100 to 5,000 eggs per gram, the subject only suffers under adverse conditions, while cases from 5,000 eggs upwards per gram may be considered as having well marked hookworm disease. Roughly 100 eggs per gram can be interpreted as representing 8 necators. An index of infection has been worked out which makes possible a direct comparison of the actual amount and severity of hookworm infection in different places. The paper concludes with chapters on the significance of hookworm in the various parts of India. The outstanding fact is that in spite of a very high incidence of infection in some parts of the country, hookworm disease is practically non-existent in most places and is limited to a relatively small percentage of the population, even in the most severely affected areas.

As regards *Ascaris* and *Trichuris* infections, these are attributed mainly to grossly polluted drinking water, while flies and dust cannot be considered to be important. *Trichostrongylus* eggs are very unevenly distributed, but in Rajputana and the Punjab about 1 per cent. infestation is found in almost every village. In Southern India 0·5 per cent. was about the average. *Gnathostoma* eggs were met with on 3 occasions. The egg of an unidentified worm is mentioned. *Heterodera* eggs occasionally occurred in over 10 per cent. of the stools examined. Fluke infections do not exist in India except in the Manipur valley, Assam, where *Fasciolopsis buski* was found in 6 per cent. Sporadic cases also occurred in Bengal, Bihar and Orissa and in Madras Presidency. It is very common in Bengal and Assam pigs, which serve as the reservoir. The water nut "*Trapa bicornis*" is the probable carrier on which the cercariae are encysted. Neither *Clonorchis* nor *Opisthorchis* were met with in India or Burma. Eggs of a new species of bilharzia named *Schistosoma incognitum* occurred in 2 cases. *Hymenolepis diminuta* was found in 23 out of 10,000 examinations. 5 per cent. of the Shans in the Shan States of Burma harbour *T. saginata*. A single case, the second recorded, of *Bertiella satyri*, was noted in Calcutta. Prevention of promiscuous soil pollution is the solution of the helminth problem, but it must be recognized that the European types of latrine with sides and roof, and the disagreeable odour which is inevitably associated with them, are very repugnant to the Indian. Many practical suggestions are offered by the author.

R. T. L.

LISSNER (L.). Stuhluntersuchung von 500 philippinischen Schulkindern. [**Stool Examination of 500 Scholars in the Philippines.**]—*Muench. Med. Woch.* 1928. July 6. Vol. 75. No. 27. p. 1163. [1 ref.] [San Carlos Milling Co.'s Hosp., San Carlos, Philippine Isl.]

A microscopical examination of the stools of 500 children by means of smears made with physiological salt solution gave the following results :—

Positive indication of worm infection	...	92.4 per cent.
Infection with hookworms	...	16.4 per cent.
" " <i>Ascaris lumbricoides</i>	...	73.0 per cent.
" " Whipworm	...	32.3 per cent.
" " <i>Oxyuris vermicularis</i>	...	7.6 per cent.

The commonest combination was ascaris and whipworm. 28.8 per cent. had two different species of worms.

R. T. L.

KOPP (F. I.), DIMITRIEVA (M. A.) & ZWETKOWA-PIROGOVSKAJA (A. E.). Helminthologische Beobachtungen im Sevastopolschen Staatlaboratorium. [**Helminthological Observations in Sebastopol.**]—*Russian Jl. Trop. Med.* 1928. Vol. 6. No. 2. German summary p. 141. [In Russian pp. 116–120. 5 refs.]

From 1,700 cases it is concluded that whipworm is the principal helminth in Sebastopol (62.1 per cent.). *Taenia* 12.6 per cent., *Oxyuris vermicularis* 10.5 per cent., *Hymenolepis nana* 6.1 per cent., *Ascaris lumbricoides* 5.6 per cent., *Dibothriocephalus latus* 0.8 per cent., *Ancylostoma duodenale* 0.3 per cent. The Fülleborn method gave better results than that of Telemann (45.7 per cent. as compared with 16.2 per cent.).

R. T. L.

DOUBROVINSKY (S. B.), KRANZFELD (A. M.), ROSENFELD (V. D.) & SALAMANDRA (E. G.). Résultats de l'examen helminthologique de certains groupes de la population de Moscou et les problèmes à l'ordre du jour de l'helminthologie médicale. [**Helminth Examination of Certain Population Groups in Moscow.**]—*Jl. Microbiol., Path. Générale et Maladies Infectieuses.* 1927. Vol. 4. No. 4. French summary pp. 523–524. [In Russian pp. 503–522. 28 refs.]

The eggs of 5 species of nematodes and three of cestodes have been found during an examination of the stools of 3,060 individuals in various establishments in and around Moscow. In addition to 873 cases of *Ascaris lumbricoides*, 584 cases of *Trichuris trichiura* and 400 cases of *Oxyuris vermicularis*, 52 cases of *Trichostrongylus* sp. (2 per cent.) and 35 cases of *Ancylostoma duodenale* were noticed. There were 97 cases of *Hymenolepis nana* (3 per cent.) 9 of *Taenia* sp. and 4 of *Dibothriocephalus latus*. Ascaris predominated in the children, 87 per cent. occurring in certain inmates at Malakhovka. Among Jewish children, however, whipworm was of higher frequency than ascaris.

R. T. L.

- i. ZOTTA (G.). Faune helminthologique humaine en Roumanie. Helminthes rares ou nouveaux en parasitologie roumaine. [**Helminths in Man in Roumania.**]—*C.R. Soc. Biol.* 1928. May 21. Vol. 98. No. 16. pp. 1456–1457. [2 refs.] [Parasit. Lab., Serotherap. Inst., Bucharest.]
- ii. —. Faune helminthologique humaine en Roumanie. Présence du *Dicrocoelium dendriticum*, Rudolphi, 1819, (*Dicrocoelium lanceatum*) chez l'homme.—*Ibid.* pp. 1458–1459. [1 ref.] [Parasit. Lab., Serotherap. Inst., Bucharest.]

1 Twenty new cases are added to the two records of infection of man in Roumania with *Hymenolepis nana* and the occurrence of *Strongyloides* in three males and a female adds this species to the list of endemic infections.

ii. *Dicrocoelium dendriticum* has been discovered in man eight times in Roumania during recent years. Seven of these showed typical eggs in the faeces. The eighth case was diagnosed from the stool and the adults were recovered at post-mortem.

R. T. L.

TISSEUIL (J.) Les parasites intestinaux en Nouvelle-Calédonie. [**Intestinal Parasites in New Caledonia.**—*Bull. Soc. Path. Exot.* 1928. Mar. 14. Vol. 21. No. 3. pp. 211-214.

The paper briefly sets out the statistical findings of the author. It would appear that 43 per cent. of the inhabitants of New Caledonia are hook-worm carriers.

R. T. L.

NEVEU-LEMAIRE (Maurice) & PELLEGRIN (Jacques). Essai d'ichthyologie médicale. Les poissons hôtes intermédiaires des helminthes parasites de l'homme. [**Medical Ichthyology. Intermediate Fish Hosts of Helminths of Man.**—*Ann. Parasit. Humaine et Comparée.* 1928. Apr. 1 & July 1. Vol. 6. Nos. 2 & 3. pp. 221-244; 343-367. With 18 text figs. [26 refs.] [Parasit. Lab., Faculty of Med., Paris.]

All the fishes known as secondary intermediate hosts of helminth parasites of man are teleosteans and those which convey the trematode parasites are all fresh water fishes. The author has collated all the available hosts and arranged them systematically with many illustrations. He notes that with rare exceptions the trematodes have two intermediaries. The family Cyprinidae provides the second intermediary for *Clonorchis sinensis*, *Opisthorchis felineus*, *Metagonimus yokogawai* and *Echinocasmus perfoliatus*. The *Heterophyes* genus is conveyed by the family Mugilidae. According to CIUREA *Idus jesus* in the family Cyprinidae is the intermediate host of the giant kidney worm. The larval plerocercoids of *Dibothriocephalus latus* develop chiefly in the Salmonidae. This invaluable work of reference concludes with a tabular list.

R. T. L.

BEQUAERT (J.). **Mollusks of Importance in Human and Veterinary Medicine. Parts I and II.**—*Amer. Jl. Trop. Med.* 1928. Mar. & May. Vol. 8. Nos. 2 & 3. pp. 165-182; 215-232. [91 refs.]

This extensive and very readable account of molluscs of medical and economic importance not only reviews recent work but usefully summarizes the classification of these mollusca and outlines the prophylactic measures which have been advocated, viz., destruction: (1) by drying; (2) by chemical means; (3) by biological controls. In the last category an interesting quotation is given from the *Journal of the New York Entomological Society* (1927) that "the luminous larva of the firefly attacks the snail [*Blanfordia nosophora*] and thus checks the spread of the parasite [*S. japonicum*] and of the disease it causes." The author has dealt comprehensively with the enemies of molluscs in PILSBRY and BEQUAERT'S Revision of African Mollusks (1927, pp. 469-479 and 532-540).

R. T. L.

GARIN (Ch.), DOUBROW & MOUNIER. Les méthodes d'enrichissement appliquées à la recherche des oeufs de parasites dans les matières fécales. Notre modification de la méthode de Telemann. [**Enrichment Method for Detection of Eggs in Faeces.**]—*Lyon Méd.* 1928. Mar. 25. Year 60. Vol. 141. No. 13. pp. 341-345. [25 refs.]

A modification of TELEMANN'S method for the concentration of helminth eggs is proposed. The new method is rapid and has a very high co-efficient. It does not cause shrivelling of the eggs. The procedure is as follows: To 30 cc. of hydrochloric acid sulphuric ether is added in small quantities in a graduated flask of 120 cc. which is constantly shaken under a stream of cold water. A limpid homogeneous mixture forms at first. The addition of ether is continued, the flask being kept continually shaken under the stream of cold water until the flask is filled. The liquid now separates into two layers, a lower clear layer and an upper layer which also clarifies rapidly. It is necessary to shake the reagent when used. A portion of faeces is emulsified in from 5 to 20 times its volume of water. This is allowed to sediment for a minute to allow the larger particles to sink. About 10 cc. are then poured into a centrifuge tube. Three or 4 cc. of the reagent is added and the tube is vigorously shaken. When the contents are thoroughly mixed about 30 turns in the centrifuge separate the fluid into 3 distinct layers. The bulk of the contents of the tube is thrown out and the last 2 or 3 drops which remain behind are examined under a coverslip. The procedure, including the examination of the preparation, occupies five minutes only. It is exceptional to find vegetable debris but muscle fibre fragments when badly digested may occur in quantity in the preparation.

R. T. L.

TIPREZ (Jean) & MOULIN (H.). Comparaison des résultats fournis, dans la recherche des oeufs de parasites dans les selles, par récolte unique ou par récoltes multiples. [**Comparison between Results of a Single Stool Examination and of a Series.**]—*C.R. Soc. Biol.* 1928. June 22. Vol. 99. No. 21. pp. 231-232. ["Saint Sauveur" Hosp., Lille.]

A comparison has been attempted between the results of an examination of a single stool and of a series of 8 to 10 consecutive stools. Of 45 patients, 26 showed nothing by either method. In eleven nothing was found from the examination of a single stool while eggs of helminths and protozoan cysts were found in a mixture of stools. In 6 cases eggs and cysts were obtained by both methods and in two cases scanty eggs were found in the single stool and none in the mixed sample.

R. T. L.

BRUNNER (Matthew). **Immunological Studies in Human Parasitic Infestation. I. Intradermal Testing with Parasitic Extracts as an Aid in the Diagnosis of Parasitic Infestation.**—*Jl. Immunology.* 1928. Jan. Vol. 15. No. 1. pp. 83-101. [16 refs.] [Jewish Hosp. Brooklyn & Cornell Univ. Med. College & New York Hosp.]

The examination of stools for ova and parasites is, in the opinion of the author, "an unreliable and unsatisfactory method of diagnosing parasitic infestation." Various workers have turned to skin-testing

for sensitivity as a possible aid to diagnosis. A series of subjects have been tested routinely with *Ascaris* and *Dibothriocephalus* saline extracts to determine how far the dermal reaction was specific and if this reaction could be utilized for practical purposes. The author finds that the reactions elicited are similar to those in hay fever and asthma. The absence of a positive reaction was not an absolute criterion of infection, for one person infected with *D. latus* remained negative to repeated tests. Extract of *Ascaris lumbricoides* gave a reaction with any nematode infestation. Constitutional reactions were elicited with *Ascaris* extract in three asthmatic persons, which indicates that extreme caution is necessary with this type of extract. A marked reaction may indicate either a recent parasitic infestation or the actual presence of parasites. It is interesting to note that a definite increase of eosinophiles was noted in some of the cases during the tests.

R. T. L.

COVENTRY (Frances A.) & TALIAFERRO (William H.). **Hypersensitivity to Helminth Proteins. Cutaneous Tests with Proteins of Ascaris, Hookworm and Trichuris in Honduras.**—*Sixteenth Ann. Rep. Med. Dept. United Fruit Company, Boston, Mass.* 1927. pp. 219-232. [27 refs.]

One hundred and thirty Honduras patients were tested by the scratch method for hypersensitivity to ascaris protein, as shown by wheal formation and erythema within 20 minutes after testing. The test has, however, no diagnostic significance, although 80 per cent. showed a reaction, for the sensitiveness could not be correlated with the presence of ascaris or other helminths. No relation could be demonstrated between skin reactivity and the presence of precipitins in the blood; 80 per cent. of 84 patients showed wheal formation and erythema after a scratch test with hookworm extracts but again no correlation existed between reaction and the occurrence of infection. With whipworm extracts 25 per cent. of 64 cases reacted but without correlation.

R. T. L.

BOGOJAWLENSKY (N. A.) & DEMIDOWA (A. J.). Sur la présence dans la mucus nasal de l'homme des oeufs de vers parasites. [**Eggs of Parasitic Worms in the Nasal Mucus of Man.**]—*Russian Jl. Trop. Med.* 1928. Vol. 6. No. 3. French summary p. 206. [In Russian pp. 153-156.]

In 47 out of 283 (i.e., 17.6 per cent.) school children helminth eggs were found in nasal mucus. 8.8 per cent. of the positive cases showed *Taenia* sp., 4.2 per cent. *Oxyuris vermicularis*, 3.2 per cent. *Ascaris lumbricoides*, 1 per cent. *Trichocephalus trichiuris* and one case (4 per cent.) gave *Hymenolepis nana*. The children were of Armenian, Turco-Tartar and Russian nationalities.

R. T. L.

LANE (Clayton). **Recent Advances in the Diagnosis and Treatment of Human Helminthiasis.**—*Brit. Med. Jl.* 1928. Aug. 4. pp. 191-195.

This was a paper read at the Tropical Section of the British Medical Association. Recent work has been largely concerned with hookworm,

The recent advances in diagnosis are summarized under: (a) the accuracy of concentrative diagnostic techniques; (b) the rate of oviposition of hookworms; (c) the degree of infection of a community. The subdirect or culture method of diagnosis is considered to be of little value apart possibly from infections elucidated by faecal examination. Under indirect diagnosis the author deals with: (a) the evidences of reaction to helminthic parasites; (b) appraising the damage done by infection. In the last section, which deals somewhat briefly with treatment, the use of carbon tetrachloride is discussed in the light of recent statistics and the author expresses the opinion that its general adoption is retrogressive. "Herd treatment" is regarded in the absence of herd diagnosis as morally unjustifiable.

R. T. L.

- i. REBELLO (Silvio), DA COSTA (S. F. Gomes) & RICO (J. Toscano). Sensibilité des cestodes à l'action de quelques anti-helminthiques. [**Susceptibility of Cestodes to the Action of Anthelmintics.**]—*C.R. Soc. Biol.* 1928. Feb. 17. Vol. 98. No. 6. pp. 473-475. With 2 text figs. [1 ref.] [Pharm. & Therap. Inst., Faculty of Med., Lisbon.]
- ii. —, — & —. Réactions de l'*Ankylostoma* étudiées par la méthode graphique. [**Reactions of Ancylostoma studied by the Graphic Method.**]—*Ibid.* pp. 475-477. With 1 text fig. [Pharm. & Therap. Inst., Faculty of Med., Lisbon.]

i. Charts are given showing the preliminary results obtained by the graphic method of recording the effect of various anthelmintics on cestode segments; *Taenia serrata* and *Dipylidium caninum* being used for the tests.

ii. Specimens of hookworms were obtained from dogs in Lisbon for these tests. The authors are unable at present to say precisely whether they belong to the species *A. duodenale* or *A. brasiliense*. They appear to have two pairs of teeth. The worms were kept alive in Rhode-Saito's liquid (pH — 6.4) at 37°-38° C. and showed remarkable activity. An emulsion of chenopodium (1 in 5,000 to 1 in 1,000) proved less effective than in the authors' earlier experiments with *Ascaris*, etc.

R. T. L.

TAKANO (Rokuro). **Bacteriological and Parasitological Study of the Night-Soil Disposal in Japan. Parts I and II.**—*Japan Med. World.* 1928. Feb. 15 & Mar. 15. Vol. 8. Nos. 2 & 3. pp. 32-36; 63-67.

Eggs of hookworm and roundworm do not develop at all in night-soil in a Japanese privy used experimentally, but tend to die off, especially in summer, although a period of one month at least is necessary for hookworm and three months for roundworm. In spring and autumn the period lengthens. When night-soil is kept it gradually liquefies. The specific gravity of the parasite eggs is greater than the faecal fluid and the upper layers do not contain any eggs. On these basic observations the author has devised a new night-soil receptacle. It is an oblong box of concrete, coated interiorly with waterproof mortar. It is closed except for the tube leading in the night-soil and the manhole

for cleansing. The tube has an internal diameter of one foot, and a length of at least three feet. Four partitions divide the receptacle into compartments. The overflow from the first fills the succeeding one and so on. The receptacle has a capacity for storing the night soil of a family for 100 days. A family of ten will require a receptacle of 1,000 litres. 500 litres are stored in the first compartment which measures 3 feet in length, width and depth. The remaining 500 litres are apportioned among the other compartments. If the receptacle were required to deal only with parasite eggs two receptacles would prove efficient. In Japan the local governments have granted a subsidy to those constructing these improved privies.

R. T. L.

MACKENZIE (L. H.). **Helminthic Fever.** [Correspondence.]—*Indian Med. Gaz.* 1928. July. Vol. 63. No. 7. pp. 412–414. With 3 charts in text.

As "helminthic fever" appears to be little emphasized three charts of different types are given illustrating the effect of ascaris infection. Many cases have come under the author's notice since 1911 in which fever has seemingly been entirely due to some form of intestinal parasite. These cases are readily cured by anthelmintics.

R. T. L.

KOHNO (Michio). [Examination of the Eggs of Parasites attached to Green Vegetables.]—*Tokyo Iji-Shinshi (Tokyo Med. News)*. 1927. Aug. No. 2536. [Summarized in *Japan Med. World*. 1928. Jan. 15. Vol. 8. No. 1. p. 14.]

An examination of market vegetables in Japan revealed the common occurrence of eggs of non-human fluke parasites. Of nematode eggs, those of *Ascaris lumbricoides* were those most frequently met. Ankylostome eggs occurred sometimes. Other parasite eggs were very rare.

R. T. L.

CADE, MORENAS & JEANNIN. De l'influence des toxines vermineuses sur l'évolution de la tuberculose expérimentale. [**Influence of Helminth Toxins on Development of Tuberculosis.**]—*Jl. Physiol. et Path. Gén.* 1928. June. Vol. 26. No. 2. pp. 250–255. [Lab. of General Path., Faculty of Med., Lyons.]

Experiments on guineapigs tend to show that the injection or ingestion of verminous products in slight doses aggravates and accelerates experimental tuberculosis in these animals.

R. T. L.

CICULESCU-MAVROMATI (Marie). Choc anaphylactique chez une malade, à la suite d'une injection intradermique d'extrait vermineux. [**Anaphylactic Shock following an Intradermal Injection of Worm Extract.**]—*Bull. et Mém. Soc. Méd. Hôpit. de Bucarest*. 1927. Apr. Vol. 9. No. 4. pp. 58–66. [19 refs.]

A clinical history is given of an epileptic young woman suffering from gastro-intestinal and other symptoms, probably helminthic in origin, in whom a typical anaphylactic shock followed the intradermal injection of an ascarid extract. The stools showed very many whipworm eggs and there was an eosinophilia of 10 per cent.

R. T. L.

CICULESCU-MAVROMATI (Marie). Un cas d'anaphylaxie vermineuse transmise de l'homme au cobaye. [**Verminous Anaphylaxis transmitted from Man to Guinea-pig.**]—*C.R. Soc. Biol.* 1927. Oct. 13. Vol. 97. No. 26. pp. 995-997. [1 ref.] [Cantacuzène Inst. & "Coltzea" Hosp., Bucarest.]

A state of passive anaphylaxis has been produced in guinea-pigs with serum from a patient with anaphylactic shock, following an intradermal reaction from an ascaris extract, but the results have been very inconstant.

R. T. L.

WRIGHT (W. Rees). **Note on the Locomotion of the Redia of *Fasciola hepatica*.**—*Parasitology*. 1928. Apr. Vol. 20. No. 1. pp. 113-114. [2 refs.] [Dept. of Agric., Univ. College, Bangor.]

It is suggested that the collar and the "posterior processes" or "procruscula" are jointly concerned in the movements of the redia. The latter anchor the organism in the burrow by becoming very turgid. At maximum elongation the contraction of the muscular collar causes it to become prominent and to anchor the enlarged anterior end in turn, the posterior end then becoming attenuated.

R. T. L.

SÉNEVET (G.) & CHAMPAGNE (R.). Troisième cas algérien de distomatose humaine à *Fasciola hepatica*. Bons effets du stovarsol. [**Third Algerian Case of *F. hepatica* Infection.**]—*Bull. Soc. Path. Exot.* 1928. Mar. 14. Vol. 21. No. 3. pp. 222-224. [2 refs.] [Pasteur Inst., Algiers.]

To the two recorded cases of infection of man in Algeria with *Fasciola hepatica*, the author adds a third. The clinical condition is described and is reported to have improved after stovarsol.

R. T. L.

CROSTE (R.). Un cas autochtone d'infection humaine par *Fasciola hepatica*. [**Indigenous Case of *F. hepatica* Infection in Man.**]—*Ann. Parasit. Humaine et Comparée*. 1928. July 1. Vol. 6. No. 3. pp. 321-322.

A native of Anglet near Bayonne, with anorexia, digestive troubles and attacks of diarrhoea was found to harbour *Fasciola hepatica* during an incision of the bile duct for biliary obstruction.

R. T. L.

TAKAHASHI (S.). Ueber die Entwicklungsgeschichte des *Fasciola hepatica* in Japan. [**Life History of *F. hepatica* in Japan.**]—*Fukuoka-Ikwadaigaku-Zasshi. Fukuoka Acta Med.* 1927. May. Vol. 20. No. 5. German summary pp. 32-33. [In Japanese.] [Hyg. Inst., Imperial Kyushu Univ., Fukuoka, Japan.]

Limnaea truncatula has not been found in Kyushu, Japan. The intermediate host of *Fasciola hepatica* is the widely distributed *Limnaea pervia*. (Another intermediary found once appears to be new.)

R. T. L.

CODVELLE, GRANDCLAUDE & VANLANDE. Un cas de distomatose humaine à "*Fasciola gigantica*" (Cholécystite aigue distomienne avec lésions particulières de la paroi vésiculaire). [Case of Human Infestation with *F. gigantica*.]—*Bull. et Mém. Soc. Méd. Hôpit. de Paris*. 1928. July 12. Year 44. 3rd Ser. Vol. 52. No. 24. pp. 1180-1185. [2 refs.]

This record of infestation of man with *Fasciola gigantica* forms the third in literature. A clinical history and the results of a histopathological examination are given.

R. T. L.

FAUST (Ernest Carroll). **Lung-Fluke Infection among the Formosan Aborigines.**—*China Jl.* 1928. Apr. Vol. 8. No. 4. pp. 191-194. With 10 figs. on 4 plates. [Peking Union Med. College, Peking.]

An interesting account is given of a visit to the endemic regions of *Paragonimus* in Formosa with brief outline of the life history, as demonstrated by K. & S. YOKOGAWA. The author states that no autochthonous case of pulmonary distomiasis has been proved for China but the constant migration of Chinese to and from the mainland, especially Fukien, where both first and second intermediary hosts abound, make the ultimate establishment of the parasite in China a possibility. The custom of the indigenous Chinese not to eat fresh-water crab meat raw accounts for the absence of the infection in China.

R. T. L.

CILENTO (R. W.). **Trematode Infestations in Northern Melanesia.**—*Med. Jl. Australia*. 1927. Nov. 19. Supplement No. 13. pp. 400-401. [4 refs.]

A somewhat alarmist view of the significance of the author's discovery, reported in 1927, of an indigenous case of *Paragonimus* in Northern Melanesia. [See this *Bulletin*, Vol. 24, p. 512.] No new facts are added.

R. T. L.

ISHII (N.). **Investigation of Clonorchiasis in Canton District in South China.**—*Taiwan Igakkai Zasshi* (*Jl. Med. Assoc. Formosa*). 1928. June. No. 279, English summary p. 44. [In Japanese.] [Hakuai-Kai Hosp., Canton, China.]

164 out of 335 patients among natives in the Canton district of China had *Clonorchis sinensis* eggs in the stool. The scientific names of the local first and second intermediary hosts will be published later by the author.

R. T. L.

TAKANO (Sadasuke). **[On the Occurrence of *Clonorchis sinensis* in Ohra County in Gumma Prefecture.]**—*Tokyo Iji-Shinshi* (*Tokyo Med. News*). 1927. Dec. No. 2552. [Summarized in *Japan Med. World*. 1928. Mar. 15. Vol. 8 No. 3. p. 70.]

The author reports on an examination of the freshwater molluscs and fishes in the Gumma prefecture [but the English summary does not indicate the result of this examination beyond stating that the two intermediaries of *Clonorchis* are prevalent]. 16 out of 98 enlisted students and 5 out of 22 newly enlisted students suffered from clonorchiasis.

R. T. L.

- OHTA (Jyuan). [On the Distribution of *Clonorchis sinensis* in Aichi Prefecture. III. Its Occurrence in Nakajima, Haguri and Niwa Counties.]—*Aichi Igakkwai Zasshi* (Jl. of Aichi Med. Soc.) 1927. Aug. Vol. 34. No. 8. [Summarized in *Japan Med. World*. 1928. Feb. 15. Vol. 8. No. 2. p. 44.]

The county of Nakajima in the prefecture of Aichi is a newly recorded endemic focus of *Clonorchis sinensis*. *Melania striatulus* var. *japonicus* thrives there and was proved experimentally to be an intermediate host. Certain [unspecified] fish were also implicated as second intermediaries.

R. T. L.

- ASADA (Junichi). [Determination of the First Intermediate Host of *Heterophyes heterophyes* occurring Parasitic in Human Body in Japan and an Experimental Investigation on its Development.]—*Tokyo Iji-Shinshi* (Tokyo Med. News). 1928. Mar. No. 2564. [Summarized in *Japan Med. World*. 1928. May 15. Vol. 8. No. 5. p. 134.]

The first intermediary of *Heterophyes nocens* in Japan is a species of brackish water snail popularly known as "Hetanari" and technically named *Tympanotonus microptera*. The cercariae die within 20 minutes in [fresh?] water, but keep alive in saline for a long time. They do not attain final development in fresh-water fish, but encyst in sea water fishes. In a dog fed with fish containing encysted cercariae the worms become adult within a week.

R. T. L.

- MAJIMA (Mitsuo). [On *Echinostoma macrorchis* found Parasitic in Human Body.]—*Tokyo Iji-Shinshi* (Tokyo Med. News). 1927. Dec. No. 2552. [Summarized in *Japan Med. World*. 1928. Mar. 15. Vol. 8. No. 3. p. 70.]

Echinostoma macrorchis has been found in the body of a boy in Kyushu. Thirty-four mature flukes were passed after oil of chenopodium. A second treatment brought away an additional 27, and a third resulted in the passage of 5 more.

R. T. L.

- CAWSTON (F. G.). **The Need for More Careful Diagnosis, More Efficient Prophylaxis, and Complete Cure of Cases suffering from Bilharzia Disease.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1928. Mar. 31. Vol. 21. No. 6. pp. 473-478. [4 refs.]

In endemic regions the surgeon should always suspect schistosome infection where, in male or female, there are ill defined pains in the lower portion of the abdomen. Unnecessary operations for appendicitis or chronic peritonitis might thus be avoided. In women bilharzial pyuria is more common than in men and albumen in the urine is more likely to be overlooked. Cawston is of opinion from the number of cases of appendicitis, dysentery and pelvic conditions in women which are due to bilharziasis that there is a decided increase in bilharzia infection both of *S. haematobium* and *S. mansoni*. The molluscan hosts in Natal breed chiefly in sugar plantations and in brick-fields, and in pools in the principal rivers and their tributaries. *S. mansoni* is carried in Natal by *Planorbis pfeifferi* which breeds freely in water cress. In small pools which have been completely dry throughout the winter months fresh-water snails can often be found and the problem of their survival is a difficult one to solve. In Natal many schools use shower-baths supplied from rain-tanks. An alternative is to pass the

river water, before it is supplied to the town swimming-bath, through the power-station to destroy cercariae by heat. Emetine causes undesirable symptoms such as cardiac depression and some other remedy must be sought for oral administration. It is noted that the cases of bilharzia infection encountered at coastal ports largely come from inland areas, such as Umtali in Rhodesia.

R. T. L.

CAWSTON (F. G.). **Trematode Parasites among Fishermen and the Poisoning of *Physopsis*.**—*Ann. Trop. Med. & Parasit.* 1928. June 12. Vol. 22. No. 1. pp. 63-65. [4 refs.]

After citing various authors to show that certain plants are intensely poisonous to fish the author states that *Tephrosia macropoda* is highly toxic to *Physopsis* sp. and suggests its commercial possibilities for eradicating the carriers of bilharzia disease.

R. T. L.

CAWSTON (F. G.). **Environmental Influences that hinder the Development of *Physopsis*.**—*Jl. Trop. Med. & Hyg.* 1928. May 15. Vol. 31. No. 10. p. 117. [1 ref.]

The decrease of bilharzia infection all along the Natal coast is associated in the author's mind with the growth of sugar cane. The molluscs are attracted by the cane and are afterwards destroyed when the canes are burned. The cultivation of some poisonous plant such as *Tephrosia macropoda* is suggested.

R. T. L.

CAWSTON (F. G.). **The Control of Bilharzia Disease.**—*Kenya & East African Med. Jl.* 1928. July. Vol. 5. No. 4. pp. 101-111.

From a limited experience it appears that the oral administration of carbon tetrachloride in repeated doses in water or milk, without an aperient unless biliousness supervenes, will enhance the value of antimony given intravenously and may even cure some cases where intravenous injections are difficult to arrange. The active principle of *Tephrosia* would appear to be one hundred times more effective in the destruction of examples of *Physopsis* than the more widely recommended copper sulphate. *Tephrosia* is widely distributed in the bilharzial districts of South Africa and is easily grown.

The author is of opinion that the return of troops from Egypt and other parts of the African continent where *S. mansoni* abounds has resulted in an increase of dysenteric symptoms and bilharzial appendicitis in parts where these complications were rare.

R. T. L.

CHRISTOPHERSON (J. B.). **The Elimination of Bilharzia Disease.**—*Jl. Trop. Med. & Hyg.* 1928. Apr. 16. Vol. 31. No. 8. pp. 89-90.

The author draws attention to the report in the "Star" of Johannesburg that a bilharzia "camp" had been formed at Rustenburg in Western Transvaal for the treatment of school children. "With the school children cured and instructed in the knowledge of sanitation the

necessity for extermination of the water-snail will not be so necessary because there will be few patients to infect the snail." It is evident that the author's sympathies lie with the alternative method of irrigating the human veins with tartar emetic in place of irrigating the waterways with copper sulphate.

R. T. L.

FAIRLEY (N. Hamilton). *Bilharzia in Australian Troops.*—*Health*. Melbourne. 1928. May. Vol. 6. No. 3. pp. 75-77.

The Commonwealth Government made a special grant for the purpose of reinvestigating the health of treated cases of bilharzia infection contracted during the war by Australian troops stationed in Egypt. It is proposed to confine the examination to single skin reactions, blood tests and investigations of the urine. As the present addresses of many treated cases are unknown to the Department of Repatriation an appeal is made for the co-operation of medical practitioners, regimental medical officers and officials of soldiers' associations.

R. T. L.

BONNIN (Henri). Splénomégalie et bilharziose intestinale. Splénomégalie égyptienne. [*Splenomegaly and Rectal Schistosomiasis.*]—*Gaz. hebdomadaire de Médecine de Bordeaux*. 1928. June 17 & 24. Vol. 49. Nos. 25 & 26. pp. 387-396; 403-413. With 9 figs. [Numerous refs.] Reprinted at pp. 25-75 of "Titres et Travaux Scientifiques (1924-1928) du Docteur Henri Bonnin." Bordeaux: A. Destout Ainé, Printer.

A valuable and very detailed review of recent literature on parasitic splenomegaly is given. The author has investigated fully and reports upon a case which presumably became infected in Somaliland, in which bowel lesions were found somewhat exceptionally in the small intestine. The author is of opinion that the term Egyptian splenomegaly ought to be reserved for those cases which have not been definitely proved to be of bilharzial origin.

R. T. L.

DIAMANTIS. Le parasite bilharzien possède-t-il chez l'homme un stage hépatique. [*Has Schistosoma an Hepatic Stage in Man?*]—*Jl. Egyptian Med. Assoc.* 1928. June. Vol. 11. No. 6. pp. 212-249. With 8 text figs.

This is a lengthy exposition of recent views on the migration of the cercariae in the definitive host and a statement of the author's personal conviction that there is no "hepatic" stage in this migration in man. He believes that the cercariae pass from the skin in the region of the perineum directly to the two viscera chiefly implicated by the disease.

R. T. L.

BRUMPT (E.). L'homme est-il le seul semeur de germes dans le cas de la bilharziose vésicale? [*Is Man the Only Reservoir of S. haematobium?*]—*Bull. Acad. Méd.* 1928. July 10. Year 92. 3rd Ser. Vol. 100. No. 28. pp. 813-818.

To the list of animals which may be experimentally infected with *Schistosoma haematobium* the author has added the hedgehog. He

draws attention to the possible importance of monkeys and hedgehogs as natural reservoirs of the disease and suggests that the susceptibility of domesticated animals would be well worth study. A later communication is promised upon the mechanism of the migration of eggs in the tissues and the factors determining the localization of the bilharzia worms in the organs of experimental animals. In the hedgehog no bladder invasion accompanied the intestinal lesions.

R. T. L.

WALKIERS (J.). Cinq cas de schistosomiase à oeufs dépourvus d'éperon dans le Haut-Uélé. [**Five Cases of Schistosomiasis with Spineless Eggs from Upper Welle.**]—*Ann. Soc. Belge de Méd. Trop.* 1928. June. Vol. 8. No. 1. pp. 21-22.

During the course of a large series of faecal examinations made at Faradje in 1925 the author discovered trematode eggs with smooth shell and without spine, in 5 cases with bloody diarrhoea. Many of the eggs contained active miracidia. It is thought that the eggs belong to a new species of schistosome for which the name *S. faradjei* is proposed. In a discussion of the paper M. RODHAIN points out that similar eggs without spine have been reported from Egypt and the Sudan.

R. T. L.

KIRKLAND (Hugh T.). **A Case of Schistosomiasis presenting Some Unusual Features.**—*Jl. Trop. Med. & Hyg.* 1928. Apr. 2. Vol. 31. No. 7. pp. 78-79. With 1 text fig. [1 ref.]

A soldier who had served in South Africa in 1901-2 passed *S. haematobium* eggs in urine in India in 1902. Eggs were again found in 1915 after a long negative intervening period of about 5 years. In 1921 he was admitted with delusional insanity into a mental hospital but no eggs were then found. In 1923 ova were present with haematuria. In 1925 (August) there was haematuria without ova, but after treatment with tartar emetic ova appeared. In 1927 ova and blood were present in the urine. The author noted a gradual and increasing appearance of pigment with progressive emaciation and intestinal disturbance which suggested an involvement of the suprarenals. There was an absence of eosinophilia.

R. T. L.

KHALIL (M.). **Vesical Bilharzia: Double Infection.** [Memoranda.]—*Brit. Med. Jl.* 1928. Mar. 31. p. 546.

Double infection of the urinary and intestinal tracts with the two species of *Schistosoma*, *S. haematobium* and *S. mansoni* is by no means rare. The author cites his previously published data showing that out of 7,090 individuals which had been examined 56 had *S. mansoni* eggs in the urine. Of these 48 had a urinary infection with both parasites while 8 had *S. mansoni* alone.

R. T. L.

BRUMPT (E.) & WERBLUNSKY (S.). Evolution de *Schistosoma haematobium* chez *Bullinus contortus*. [**Development of *S. haematobium* in *B. contortus*.**]—*Bull. Soc. Path. Exot.* 1928. Jan. 11. Vol. 21. No. 1. pp. 8-9.

Specimens of *Bullinus contortus* collected in the region of Porto Vecchio, Corsica, were experimentally submitted to infection with

miracidia of *Schistosoma haematobium*. 35 molluscs survived 52 days after the experiment and of these 28 (i.e., 80 per cent.) were found to be infected. This remarkable susceptibility supports the contention of ANDERSON that the transfer of African troops to Corsica is a potential source of danger to the local population.

R. T. L.

NESSMANN (V.) & TRENSZ (F.). Nouveaux cas de bilharziose intestinale à *Schistosoma haematobium* observés au Gabon. [**Intestinal Schistosomiasis due to *S. haematobium* in Gabon.**—*Ann. Parasit. Humaine et Comparée*. 1928. Apr. 1. Vol. 6. No. 2. pp. 182-185. [Dr. Schweitzer's Hosp., Lambarene, Gabon.]

The authors remark on the frequency of intestinal infection with *S. haematobium* in Gabon, French West Africa, and the absence of indications of vesical implication. Only three cases of rectal infection are specifically recorded, but eight other cases are mentioned where no microscopical examination could be made to confirm the apparent absence of vesical infection.

R. T. L.

CORT (W. W.). **Schistosome Dermatitis in the United States (Michigan).**—*Jl. Amer. Med. Assoc.* 1928. Mar. 31. Vol. 90. No. 13. pp. 1027-1029. With 1 text fig. [7 refs.] [Univ. of Michigan Biol. Station & Dept. of Helminth., Johns Hopkins Univ. School of Hygiene, Baltimore, Md.]

Cases of dermatitis of unknown etiology have developed for years in persons wading for biological specimens at the Michigan Biological Station on Douglas Lake, Michigan, and other cases have been noted at certain other resorts in that region. The author, while collecting molluscs, accidentally discovered that *Cercaria elvae* produced a severe prickling sensation on the wrists followed by papules and in 48 hours a pustular eruption with intense itching. After 4 days the swelling had disappeared and in 5 days the pustules began to dry up. The mollusc belonged to the species *Lymnaea emarginata-angulata*.

R. T. L.

BERNARD (L. M. J.). Le traitement de la bilharziose vésicale. [**Treatment of Vesical Schistosomiasis.**—*Arch. Méd. et Pharm. Milit.* 1928. June. Vol. 88. No. 6. pp. 939-945. [3 refs.]

The danger of schistosomiasis becoming endemic in Corsica and the South of France from the infection of local *Bullinus* by Senegalese troops is not imaginary. Over 6 per cent. of the troops examined have been found to be carriers of *S. haematobium*. Treatment consists of intravenous injections with tartar emetic and diathermic coagulation of the vesical lesions. 40 cases have been treated by this combination and the cures have been exceptionally rapid. Hospital supervision is however necessary for about six weeks.

R. T. L.

- KHALIL (M.).** Accidents and Complications occurring during the Treatment of Bilharziasis by Antimony Compounds.—*Jl. Egyptian Med. Assoc.* 1928. Mar. Vol. 11. No. 3. pp. 97-106. [4 refs.] [Research Section, Public Health Dept., Cairo, Egypt.]

The author has collated the experience of the staffs of the Ankylostoma and Bilharzia Clinics and has set out the various indications and contra-indications for treatment, the method of preparing and administering the treatment and the symptoms appearing after injection. These latter comprise coughing, fainting, rise of temperature, vomiting and sudden death. During 1927 6 fatal cases were recorded among 284,934 cases of injection with tartar emetic, but "it is certain that the official number of deaths . . . is very much below what is expected. There is no doubt that many cases are concealed by the relatives . . . to avoid post-mortem examination and legal investigation."

R. T. L.

- SHATTUCK (George C.) & WILLIS (Paul T.)** Schistosomiasis treated with Antimony Sodium Thioglycollate and with Antimony Thioglycollamide.—*Jl. Trop. Med. & Hyg.* 1928. May 15. Vol. 31. No. 10. pp. 115-116. [3 refs.] [Harvard Med. School, Boston, Mass.]

Antimony sodium thioglycollate and antimony thioglycollamide have been used successfully in the treatment of granuloma inguinale in the United States and have been shown to have a toxicity considerably lower than tartar emetic. It has been found by the authors, working in Liberia, that there was a markedly beneficial action in a case of urinary bilharziasis. Other tests were made by Dr. K. Waller Todd at Yakusu in the Belgian Congo, but details were not given of the score of cases in which "prompt and favourable effects" are reported.

R. T. L.

- SOBHY (M.).** Bilharziasis of the Conjunctiva.—*Jl. Egyptian Med. Assoc.* 1923. Jan. Vol. 11. No. 1. pp. 12-15. With 2 text figs and 2 coloured plates.

The case described is one in a child aged 8 years with a swelling on the upper eyelid, suggesting an abscess. On exploratory incision no pus was found. Microscopical examination of the growth showed the presence of terminal spined eggs of *S. haematobium*.

R. T. L.

- ANDERSON (Ch.) & DE LAGOANÈRE (J. L.).** La bilharziose en Tunisie. Nouveaux essais d'infestation de *Bullinus brocchii* avec des oeufs de *Schistosomum haematobium*. [Attempts to infest *B. brocchii* with *S. haematobium* in Tunis.]—*Arch. Inst. Pasteur de Tunis.* 1927. Dec. Vol. 16. No. 4. pp. 397-399. [4 refs.]

The presence of Senegalese troops in Tunis gave the authors an abundance of material to conduct experiments with *Bullinus brocchii*. In two of the dissections sporocysts were found; the others were negative. The experiments were made during March and April.

R. T. L.

LEIPER (R. T.). **The Occurrence in Cyprus of *Bullinus contortus* in the Endemic Area of *Schistosoma haematobium*.**—*Jl. Helminthology*. 1928. June. Vol. 6. No. 2. pp. 117-120. [2 refs.]

At Syrianokhori, the only village in Cyprus in which *Schistosoma haematobium* is known, specimens of *Bullinus contortus* were found in the deep irrigation channels carrying water from the river. Search in several other parts of the island failed to reveal this species. The distribution of the mollusc and of the disease coincide.

R. T. L.

ANGEL MARÍN (Rafael). **Studies on Schistosomiasis (*S. mansoni*) in Porto Rico. III. Cercariae from *Planorbis guadeloupensis*.**—*Porto Rico Rev. of Public Health & Trop. Med.* 1928. Apr. Vol. 3. No. 10. pp. 397-402. With 4 figs. [3 refs.] [School of Trop. Med., Univ. of Porto Rico.]

In Porto Rico 4 different kinds of cercariae occur in *Planorbis guadeloupensis*. Two are fork-tailed, two are echinostome cercariae. One of the fork-tailed cercariae has been shown experimentally by HOFFMAN to be the larva of *S. mansoni*. The second kind possesses eyespots and closely resembles *Dicranocercaria ocellifera* figured by LUTZ from Brazil.

R. T. L.

LAMBERT (Robert A.) & BURKE (Alice M. B.). **Studies on Schistosomiasis (*S. mansoni*) in Porto Rico. IV. Correlation of Clinical and Autopsy Findings with Case Reports.**—*Porto Rico Rev. of Public Health & Trop. Med.* 1928. Apr. Vol. 3. No. 10. pp. 403-415. [School of Trop. Med., Univ. of Porto Rico.]

35 new autopsies gave evidence of 20 per cent. infection with *Schistosoma mansoni* as compared with 11 per cent. out of 100 cases previously recorded. This higher incidence is attributed to the fact that the larger number of the cases came from other parts of Porto Rico outside San Juan. The authors report the clinical and autopsy findings of 4 out of the 18 positives and make some comments on the remainder. It is apparent from these notes that light infections may not give rise to any symptoms and may not affect the health at all. Only in two of the 18 cases was death undoubtedly attributable to schistosomiasis. In one case the clinical picture was that of hepatic cirrhosis. In the other the intestinal symptoms were those of a chronic infectious colitis with secondary bacterial infection as probably a major factor. Experimental hyper-infections in rabbits and monkeys give lesions which are very different from those seen in man.

R. T. L.

GONZÁLEZ MARTINEZ (I.). **Studies on Schistosomiasis in Porto Rico.**—*Porto Rico Rev. of Public Health & Trop. Med.* 1928. May. Vol. 3. No. 11. pp. 443-457. With 8 figs. [10 refs.]

LAMBERT (Robert A.) & HOFFMAN (William A.). **"Studies on Schistosomiasis in Porto Rico." A Reply.**—*Ibid.* pp. 458-459.

These are notes dealing with questions of priority. Lambert and Hoffman recognize that Martinez was the first to observe schistosomiasis in Porto Rico. They point out that the co-existence of *S. mansoni* and *Planorbis guadeloupensis* does not necessarily establish

that the latter is carrier of the former. Martinez states that Hoffman's map of the distribution of bilharzia infestations of planorbis is erroneous as far as the region of Mayagüez is concerned. He also maintains that the view expressed by Lambert that the lesions produced by *S. mansoni* are due essentially to the irritative action of the ova cannot be sustained. [An editorial note explains that the departure from the policy of furnishing scientific information in the most objective manner possible is not to be taken as a precedent.]

R. T. L.

HARLÉ (G.). La bilharziose intestinale sur les Hauts Plateaux à Madagascar. [**Rectal Schistosomiasis in the Uplands of Madagascar.**]—*Bull. Soc. Path. Exot.* 1928. May 9. Vol 21. No. 5 pp 380-382. [2 refs.]

A new endemic focus for *Schistosoma mansoni* has been discovered at Ambositra, in the uplands of Madagascar. Specimens of *Planorbis madagascariensis* were found to be naturally infected with two species of cercaria, one large with simple tail, the other small with bifid tail and absence of pharyngeal bulb. It is supposed that the latter is the cercaria of *St mansoni*.

R T L

LEGER (Marcel). Au sujet de la note de G. HARLÉ sur la bilharziose intestinale à Madagascar [**Harlé's Note on Rectal Schistosomiasis in Madagascar.**]—*Bull. Soc. Path. Exot.* 1928 June 13 Vol. 21. No. 6. pp 435-436.

A propos of HARLÉ's note, attention is drawn to a publication by LEGER and PRINGAULT (1921) on "Intestinal Helminthiasis and Bilharziasis due to *Schistosoma mansoni* in Madagascar" in which the provinces Ambotsitra, Fianarantsoa and Farafangana were shown to be infected with bilharziasis. No bilharzia infection was found in the uplands north of Antsirabé and Tananarive.

R T L

SFVERINGHAUS (Aura Edward). **Sex Studies on *Schistosoma japonicum*.**—*Quarterly Jl. Microscop. Sci.* 1928. Apr. Vol. 71. Pt. 4. N.S. No. 284. pp. 653-702. With 60 figs on 4 plates and 1 chart. [36 refs.] [Peking Union Med. College, Peking & Dept. of Zool., Univ., Columbia.]

In the Soochow region the incidence of natural infection of snails with *Schistosoma japonicum* is about 2 per cent. With this low incidence it was possible to plan infections of hamsters by cercariae from a single snail and to be reasonably sure that practically all the snails had been infected by a single miracidium. Exactly half the snails gave cercariae which developed into female flukes, those from the other half resulting in males. The males developing in the absence of females are normal and unretarded in growth, but the females developing in the absence of males fail to develop normally. The length is less than one-fifth the normal, the diameter is constant and less than one-quarter the normal size and the reproductive organs fail except for a blind tube representing the uterus. This state may be maintained for even 268 days, but if at any time male cercariae are introduced into the host, the immature females rapidly become normal. A study of the process of spermatogenesis substantiates the evidence obtained experimentally that sex is determined in the fertilized egg.

R. T. L.

SUDA (Kansaku). **On the Oral Infection of the *Schistosomum japonicum* (Preliminary Report).**—*Nagoya Jl. Med. Sci.* (continuing the *Aichi Jl. Experim. Med.*) 1927. Dec. 25. Vol. 2. No. 2. pp. 107-109. With 2 text figs.

Experimental studies on rabbits indicate that oral infection with *Schistosoma japonicum* is possible, but is much rarer than the dermal route as "the cercaria is not able to reside directly on the mucous membrane and the majority died off on the surface of the digestive tract without any resistance against the various kinds of digestive fluid." The indispensable condition of oral infection is that the cercaria must be swallowed with a large amount of water to dilute the digestive fluids. Histologically, the author has confirmed the penetration of the wall of the mouth, oesophagus, stomach and intestine by cercariae.

R. T. L.

TAKAHASHI (Shozo). **On the Cercaria of *Schistosoma japonicum* Katsurada.**—*Okayama-Igakkai-Zasshi* (*Zent. d. Okayama Med. Gesellsch.*) 1928. July. Vol. 40. No. 7 (No. 462). German summary pp. 1381-1382. [In Japanese pp. 1349-1380. With 34 figs. on 10 plates.] [Bact. Dept., Okayama Med. Univ., Okayama.]

No dimorphism could be detected in the cercariae of *S. japonicum*. The anatomy of the cercaria has been carefully studied. A layer of diagonal muscle lies beneath the circular and longitudinal layers in the anterior half of the body wall and there are four retractor muscle bands at the anterior end of the body. There are sensory organs with delicate hair-like processes scattered over the body and tail. The "head gland" of NARABAYASHI is renamed "headsac" as it has no secretory function. In the "ciliated area" of CORT are 2 special flame cells. The opening of each poison gland has a hair brush acting apparently as a closing apparatus. The anterior 2 pairs of glands differ morphologically and microchemically from the 3 pairs of posterior glands. The head spines are not hollow and do not cap the orifice of the poison gland as FAUST supposed.

R. T. L.

MAHFUZ (A. H.). [**A Case of *Schistosoma bovis* in Man.**—*Egyptian Med. Rev.* 1927. Apr. pp. 301-306. [In Arabic.]

In a case of haematuria and painful micturition 4 bodies thought to be similar to the eggs of *S. bovis* were seen by the author.

R. T. L.

VERGEER (Teunis). ***Diphyllbothrium latum* (Linn., 1758), the Broad Tapeworm of Man: Experimental Studies.**—*Jl. Amer. Med. Assoc.* 1928. Mar. 3. Vol. 90. No. 9. pp. 673-678. With 1 map in text. [9 refs.] [Dept. of Zoology & Biol. Station, Univ. of Michigan, Ann Arbor.]

It is shown that *Stizostedion canadense-griseum*, *S. vitreum*, *Esox lucius* and *Lota maculosa* harbour the plerocercoid stages of *D. latum* in North America. The Portage Lake region in the northern peninsula of Michigan is an endemic area and contains a considerable Finnish population. The movement of fish into Lake Superior may extend the

range of the distribution of the parasite. It is to be noted that plerocercoids of other species of Dibothriocephalidae occur in *Leucichthys* spp. and in *Lota maculosa*.

R. T. L.

VERGEER (Teunis). **Canadian Fish, a Source of the Broad Tapeworm of Man in the United States.**—*Jl. Amer. Med. Assoc.* 1928. May 26. Vol. 90. No. 21. pp. 1687-1688. [6 refs.] [Dept. of Zoology, Univ. of Michigan, Ann Arbor.]

In 27 yellow pike or wall-eye fish (*Stizostedion vitreum*) from a shipment from Lake Winnipeg, Canada, 5 were found to harbour each a single plerocercoid of *D. latum*. This supports the author's previous contention that the eating of infested fish from Canada may be responsible for a large percentage of the cases found in the United States outside the known endemic areas.

R. T. L.

McGAVRAN (Edward G.) & SONGKLA (Mahidol). ***Diphyllobothrium latum* in Massachusetts. A Report of Two Indigenous Cases.**—*Jl. Amer. Med. Assoc.* 1928. May 19. Vol. 90. No. 20. pp. 1607-1608. [Med. School, Harvard Univ., Boston, Mass.]

At Boston, U.S.A., the adult cases of infection with *D. latum* have all been among patients of foreign birth, but very recently two cases of unquestionable indigenous infections have been found at the children's hospital. These are thought to be the first reported cases of native infection in the state of Massachusetts and outside the immediate Great Lakes district. The families to which the patients belonged were stated to have purchased "white-fish" from nearby fish markets which derive their supplies largely from the Great Lakes region and the Ohio River.

R. T. L.

MAGATH (Thomas B.). **Distribution of Broad Tapeworm.** [Correspondence.]—*Jl. Amer. Med. Assoc.* 1928. May 19. Vol. 90. No. 20. p. 1650.

The author has obtained wall-eyed pike from Lake Winnipeg, Manitoba, and in a large percentage of them has found larvae which produced typical *Dibothriocephalus latum* when fed to dogs. A great proportion of these pike sold in the middle west markets come from Canadian lakes.

R. T. L.

NICHOLSON (Daniel). **Fish Tapeworm. Intestinal Infection in Man: the Infestation of Fish in Manitoba Lakes.**—*Canadian Med. Assoc. Jl.* 1928. July. Vol. 19. No. 1. pp. 25-33. With 9 figs. & 1 chart in text. [6 refs.]

Patients who pass large segments of *D. latum* at frequent intervals rarely have anaemia. The anaemia varies from a very slight to a most profound pernicious aplastic type. Anaemia occurs in only 1 per cent. of those affected and in patients who rarely cast segments. The Winnipeg General Hospital records show that 5 cases were treated in 1927

and ten in the period 1924-26. Most tapeworm cases are treated outside the hospital. Freezing, smoking, dry-cleaning or pickling in salt do not destroy the parasite. 5 minutes at 65° C. will kill the larvae.

R. T. L.

LOPEZ-NEYRA (C. R.). Recherches sur le genre *Dipylidium*, avec description de quatre espèces nouvelles. [**The Genus *Dipylidium*. Four New Species.**—*Bull. Soc. Path. Exot.* 1928. Mar. 14. Vol. 21. No. 3. pp. 239-253. With 8 text figs. [1 ref.] [Zool. & Parasit. Lab., Faculty of Pharmacy, Univ., Grenada.]

In this revision of the genus *Dipylidium* it is proposed to supplant the generic name *Diplopylidium* (Beddard 1913) by *Progynopylidium* Skriabine 1924, as the type species of the former is insufficiently described. Four new species, viz., *Progynopylidium monoophoroides*, *Dipylidium porimamillanum*, *Dipylidium carracidoi* and *Joyeuxia pasqualeiformis* are described.

R. T. L.

BACIGALUPO (J.). L'évolution de l'*Hymenolepis nana*. [**Development of *H. nana*.**—*C.R. Soc. Biol.* 1928. June 22. Vol. 99. No. 21. p. 239. [Central Military Hosp., Buenos Aires.]

The development of *Hymenolepis nana*, a parasite of man, can take place in two ways, either directly in white rats or indirectly in *Tenebrio molitor*. In Buenos Aires 5 per cent. to 10 per cent. of the children are infected and parasites are very numerous. The author thinks that once man is infected from an intermediate host, the parasites increase in number as a result of auto-infection. The term diheteromonoxeny is proposed for this type of parasite, which can equally evolve in a single host or in two.

R. T. L.

BAER (Jean G.). **On a New Species of *Hymenolepis* from a Monkey.**—*Jl. Parasit.* 1927. Sept. Vol. 14. No. 1. pp. 48-50. With 1 text fig. [8 refs.] Zool Inst, Univ. of Neuchâtel.]

At the conclusion of a brief description and discussion of *Hymenolepis cercopithecii* the author refers to the classification of MAYHEW (1925) and expresses the opinion that the genus *Wardium* is artificial. He accepts for the present, however, the genera *Hymenolepis*, *Weinlandia* and *Wardium* as subgenera in MAYHEW's classification.

R. T. L.

MOMMA (Kenji). **On a Case of *Hymenolepis diminuta* Rud., 1819.**—*Ann. Trop. Med. & Parasit.* 1928. June 12. Vol. 22. No. 1. pp. 1-3. [7 refs.] [Osaka Med. College, Osaka, Japan.]

— — —. [**On *Hymenolepis diminuta* (Rud., 1819) found Parasitic in Human Body.**—*Tokyo Iji-Shinshi* (Tokyo Med. News). 1927. Dec. No. 2552. [Summarized in *Japan Med. World.* 1928. Mar. 15. Vol. 8. No. 3. p. 70.]

At Goiyo a baby 253 days after birth passed four *Hymenolepis diminuta*, each without scolex. These measured 90 mm., 40 mm., 42 mm. and 55 mm. respectively. Several cases previously recorded in Japan are cited.

R. T. L.

CRAM (Eloise B.). **A Species of the Cestode Genus *Bertiella* in Man and the Chimpanzee in Cuba.**—*Amer. Jl. Trop. Med.* 1928. July. Vol. 8. No. 4. pp. 339-344. With 4 figs. [8 refs.] [Bureau of Animal Industry, Washington, D.C.]

Bertiella satyri has been reported from man by BLANCHARD (1913) and CHANDLER (1925). The present paper brings under notice a case of human infection with another species of the genus, viz. *Bertiella mucronata*. The specimens were collected by Dr. Alberto RECIO of Havana, Cuba, and occurred in a young Spaniard and three African chimpanzees which had been taken to Cuba from Africa. The Spaniard had lived for the previous 10 years in Cuba, but before that had spent a year in the Canary Islands. The original record of *B. mucronata* was based on material from a howling monkey of Paraguay.

R. T. L.

KELLAWAY (C. H.). **Diagnostic Tests in Hydatid Disease.**—*Med. Jl. Australia.* 1927. Nov. 19. Supp. No. 13. pp. 388-392. [12 refs.]

In the very early stages of hydatid infection the only test likely to yield a reaction, in the author's opinion, is the intradermal one which may give a delayed response as well as an immediate one. At this stage there may be some eosinophilia. At a later stage with a large uncomplicated cyst having intact laminated membrane and thickened adventitia, the intradermal test holds but the fluid of the cyst is of low antigenic power and there is no eosinophilia as a rule. When the formation of daughter cysts has occurred eosinophilia may be present. There may be a reaction to the complement fixation test and often there is a high titre. The Casoni test may give only an immediate wheal, though later on both phases of the skin reaction occur. In cases of rupture or suppuration complement fixation is usually positive with a high titre of circulating antibody. The intradermal test may fail. When cure by operation or death of the parasite occurs, the amount of complement fixation may be small or nil, while the Casoni test is both immediate and delayed. The Casoni test is invaluable in early and uncomplicated cases. In cases where there are recurrences or residual cysts or in complicated cysts, the complement fixation test is of the greatest value. K. D. FAIRLEY's simple precipitin test should be useful where laboratory facilities are not available for complement fixation.

R. T. L.

BURNET (Et.), CAILLON (L.) & BRUN (G.). Sur les méthodes biologiques du diagnostic du kyste hydatique. [**Biological Methods of Diagnosis of Hydatid Cyst.**]—*Arch. Inst. Pasteur de Tunis.* 1927. Sept. Vol. 16. No. 3. pp. 291-299.

The various methods of diagnosis have been studied in forty cases of hydatid and 100 controls in the native hospital (Hôpital Sadiki) of Tunis. The eosinophilia was practically the same in the two categories and appears to be an unreliable method of diagnosis in countries where helminth infections are common.

The precipitin reaction gave no positive indication either in 21 carriers or in 30 controls. This test is therefore regarded as demonstrably useless. The intradermal reaction gave a much lower proportion of reactions than that reported by other observers and nearly equalled the reactions of the controls. The reaction is neither constant nor specific. The complement fixation test was introduced by GHEDINI, elaborated by WEINBERG and confirmed by FAIRLEY. In Tunis, less favourable results have been obtained. During 1925-6 2 reactions were obtained from 22 proved carriers of cysts and two positive reactions were shown by non-carriers. A second series gave one reaction in 5 carriers and 2 reactions in 39 non-carriers. With sheep antigen similarly inconclusive results were obtained but the cases tested were too small in number for a final conclusion to be drawn.

R. T. L.

GOLDSWORTHY (Neil E.). **The Precipitation Test in Hydatid Infestation.**—*Jl. Path. & Bact.* 1928. Apr. Vol. 31. No. 2. pp. 435-436. [Dept. of Path., Univ., Cambridge.]

Experiments are described which show clearly that in the serum precipitation test for hydatid disease, attention must be paid to the principle of optimal proportions. When the antigenic content is low, it is possible to fail to detect specific antibodies in a patient's serum unless the serum is sufficiently diluted to avoid a relative excess of antibodies.

R. T. L.

L'ABBÉ (Marcel), LOMON & SELIGMAN. Diagnostic radiologique des kystes hydatiques intrahépatiques. [**Radiological Diagnosis of Intrahepatic Hydatid Cysts.**]—*Bull. et Mém. Soc. Méd. Hôp. de Paris.* 1928. May 31. Year 44. 3rd Ser. Vol. 52. No. 18. pp. 884-891. With 3 text figs. [10 refs.]

Three cases are described in which hydatid invasion of the liver was diagnosed by X rays. The text is illustrated by two skiagrams and an anatomical chart.

R. T. L.

ROSS (I. Clunies). **In Vitro Tests of the Toxicity of Certain Drugs for Hydatid Scolices.**—*Australian Jl. Experim. Biol. & Med. Sci.* 1927. Dec. 16. Vol. 4. Pt. 4. pp. 283-288. With 2 text figs. [12 refs.] [Council for Scient. & Indust. Res., Vet. School, Univ., Sydney.]

As a preliminary to *in vivo* tests, the effect of certain drugs on hydatid brood capsules and scolices *in vitro* was investigated. Loss of clarity and motility on the warm stage at 39° C. with dulling of the calcareous corpuscles and hooks were taken as indications of death. Acriflavine, tartar emetic, emetine and trypan-blue were tried and proved toxic in this order. Acriflavine killed in dilutions of 1 in 1,000 in 3 hours, 1 in 10,000 in 8 hours and 1 in 100,000 in 17 hours. In trypan-blue scolices survived in a 1 in 200 solution for 16 hours. It is pointed out that these results may not apply *in vivo*, although tartar emetic is immeasurably enhanced in action *in vivo* as compared with its effect *in vitro* in aqueous solution in the treatment of bilharziasis.

R. T. L.

DEW (H. R.). **Hydatid Anaphylaxis.**—*Med. Jl. Australia.* 1927. Oct. 29 & Nov. 5. Supplements Nos. 10 & 11. pp. 319-320; 321-323. [17 refs.] [Walter & Eliza Hall Inst., Melbourne.]

The author states that even in simple cases the puncture of a hydatid cyst may be dangerous and even fatal from anaphylactic shock. If the erythematous stage of the Casoni reaction is very evident there is danger of anaphylactic symptoms following the absorption of fluid at an operation, while the risk is slight if only a wheal is produced, or the second stage is a mild reaction. Owing to the abolition of the anaphylactic state by general anaesthesia, grave symptoms rarely if ever occur at operation, even if much hydatid fluid is spilled into the wound. Delayed symptoms may occur afterwards and careful packing and rapid removal of the hydatid fluid is essential.

R. T. L.

KELLAWAY (C. H.). **Hydatid Fluid as an Anaphylactic Antigen.**—*Jl. Path. & Bact.* 1928. Apr. Vol. 31. No. 2. pp. 141-156. With 4 text figs. [13 refs.] [Walter & Eliza Hall Inst., Melbourne.]

In earlier work Kellaway, BRYCE and WILLIAMS (1924) used the isolated uterus of the virgin guineapig to test the antigenic and combining powers of hydatid fluid and of various extracts of scolices. The difficulties occurred from the presence of the small amount of proteins present in hydatid fluid and by the frequent presence of substances which stimulate plain muscle and also by the fact that the isolated uteri of guineapigs sensitized with hydatid fluid may react maximally four or five times in succession before becoming desensitized. Most of these difficulties have now been overcome and it is shown that host serum proteins are present in hydatid fluid as well as other substances which can act as anaphylactic antigens and are probably proteins of parasitic origin.

R. T. L.

CAUCHEMEZ. La cysticercoze bovine et le taeniasis humain en Syrie. [**Bovine Cysticercosis and Human Taeniasis in Syria.**]—*Bull Acad. Vét. de France.* Paris. 1928. Mar. Vol. 1. pp. 77-80.

The Trasbot Prize having been awarded to a paper on cysticercosis and human taeniasis in Syria by the Académie Vétérinaire de France, the referee M. Cauchemez has given a brief summary of its contents. The author of the essay is not yet disclosed. Syria is apparently heavily infested for 13.85 per cent. of the cattle in the region of Aleppo and 16.6 per cent. around Homs are infested with cysticercosis. In the northern part of Syria one-third of the population harbour *Taenia saginata*. The extent of the infection is attributed to the coprophagous habits of the cattle, to the absence of suitable latrines and the placing of these over water courses.

R. T. L.

DÉVÉ (F.). Sur le développement des ortho-scolex échinococciques. [**Development of the Ortho-scolex of Hydatid Cysts.**]—*C.R. Soc. Biol.* 1928. Jan. 13. Vol. 98. No. 1. pp. 16-18. With 5 text figs. [2 refs.]

Criticizing DEW's recent description of the development of the scolex in hydatid cysts Dévé remarks that this reproduces in the main the

scheme of development as interpreted by LEUCKART and illustrated schematically by BLANCHARD. It represents however, an abnormal condition. In fact, the ortho-scolex develops as originally described by WAGENER.

R. T. L.

DÉVÉ (F.) Scoliciculture hydatique en sac de collodion et *in vitro*.—[**Cultivation of Hydatid Scolices.**]—*C.R. Soc. Biol.* 1928. May 4. Vol. 98. No. 14. pp. 1176-1177. [5 refs.] [Bact. Lab., School of Med., Rouen.]

By using a mixture composed of equal parts of hydatid fluid and human ascitic fluid kept at 37° C. for 43 days, without renewal of the medium, the author has now succeeded in cultivating test tube echinococcus scolices into veritable hydatid microvesicles with thick cuticularized walls. He was successful also in cultivating scolices into opaline hydatid vesicles of relatively large size in 79 days in collodion capsules inserted into the peritoneal cavity of rabbits.

R. T. L.

DÉVÉ (F.) & LACROIX (A.) Inoculations échinococciques dans la chambre antérieure de l'œil du lapin. [**Inoculation of Hydatid in the Anterior Chamber of the Rabbit's Eye.**]—*C.R. Soc. Biol.* 1927. Oct. 21. Vol. 97. No. 27. pp. 1054-1055.

An account is given of the successful growth of hydatid after injection experimentally into the anterior chamber of the eye of the rabbit. No such infection is known to occur naturally. It is shown that the development of the hydatid cyst in the eye, even in contact with the lens, does not necessarily induce cataract directly by irritation or by the toxic effect of the hydatid fluid, as had been maintained by DEMARIA.

R. T. L.

DÉVÉ (F.). Essai de vaccination anti-échinococcique par le sable hydatique tyndallisé. [**Attempt to vaccinate against Hydatid by Sterilized Hydatid Sand.**]—*C.R. Soc. Biol.* 1927. Oct. 28. Vol. 97. No. 28. pp. 1130-1131. [2 refs.]

Attempts to vaccinate rabbits against hydatid were made but proved unsuccessful.

R. T. L.

DÉVÉ (F.) & ROLLAND (P.) Echinococcose expérimentale du tibia. Etude histologique. [**Experimental Echinococcosis of the Tibia. Histology.**]—*C.R. Soc. Biol.* 1927. Oct. 28. Vol. 97. No. 28. pp. 1132-1133. [2 refs.]

Experimental inoculation of the tibia of a rabbit has enabled the authors to confirm the various anatomo-pathological and pathogenic details of which previous description has been given.

R. T. L.

AITKEN (C. J. Hill). **A Case of Somatic Taeniasis.** [Memoranda.]—*Brit. Med. Jl.* 1928. June 2. pp. 943-944.

An interesting clinical history of a case of *Cysticercus cellulosae* with mental symptoms.

R. T. L.

PEARCE (T. Vibert). **Somatic Taeniasis.** [Memoranda.]—*Brit. Med. Jl.* 1928. Sept. 8. p. 442.

A case similar to that reported by AITKEN [see this *Bulletin* above] occurred in St. Giles' Hospital in 1927. In the army in India in 1920 after an attack diagnosed as malaria epileptic fits occurred at first weekly, but later at two monthly intervals. When under observation in hospital, a nodule on the scalp was noticed and others elsewhere. On excision one proved to be a cyst containing hooklets. The blood showed a 3 per cent. eosinophile count. The Wassermann reaction was negative.

R. T. L.

CASTELLANO (Temistocles) & ORGAZ (Jorge). Sobre un caso de quiste hidatidico pulmonar y probable hidatidosis cardíaca. [**Hydatid of Lung and, probably, of the Heart.**]—*Prensa Méd. Argentina.* 1928. July 20. Vol. 15. No. 5. pp. 209-217. With 11 text figs. 6 refs.]

The patient was an Argentine, 23 years old. Eight months prior to coming to hospital he began to spit blood in the mornings, though he felt quite well. This continued, and later he suffered from dyspnoea on movement and slight vertigo. He had not lost weight. X-rays showed a shadow, the size of a small orange, in the left lung, at the level of the fourth and fifth intercostal spaces, and another smaller swelling of the left lateral aspect of the left ventricle. The auricular beat was 80 per minute, the ventricular 40, both regularly spaced. He had had venereal disease, but the Wassermann reaction was negative. Complement fixation test for hydatid gave + + +, and the Casoni intradermal test a strong positive also. He remained in hospital for six months, but, except for a reduction in the haemoptysis, the signs and symptoms underwent no change. His general health remained good.

H. Harold Scott.

FONSECA (Aureliano). Cysticercose ocular sub-conjunctival. [**Sub-conjunctival Cysticercosis.**]—*Brasil-Médico.* 1928 May 12 Vol 42. No. 19. pp. 517-518.

The sixth case of subconjunctival cysticercosis from Brazil is recorded. An examination of the faeces indicated that whipworms, hookworms and *Hymenolepis nana* were present. No information was obtained pointing to infection with *Taenia*, although of 12 cases cited by Dr. NICOLINO in his thesis, 7 were carriers.

R. T. L.

LOEPER (M.) & GARCIN (R.). Sixième cas français et probablement artésien d'échinococcose alvéolaire du foie. [**Sixth French Case of Alveolar Echinococcosis of Liver.**]—*Bull. et Mém. Soc. Méd. Hôpit. de Paris.* 1927. July 28. Year 43. 3rd Ser. Vol. 51. No. 26. pp. 1230-1238. With 3 text figs. [6 refs.]

Alveolar cyst of the liver is very rare in France. The authors report the sixth case known in man there. The patient died of pneumonia and a detailed account of the post-mortem findings is given with a striking illustration of the infected liver.

R. T. L.

- TAKAISHI (Takeo). [Digestive Experiment with *Cysticercus fasciolaris*, together with a Notice on the Frequency of Parasitism and the Histological Findings of the Surrounding Liver.]—*Tokyo Iji-Shinshi* (Tokyo Med. News). 1927. Aug. No. 2535. [Summarized in *Japan Med. World*. 1928. Jan. 15. Vol. 8. No. 1. p. 14.]

A mixture containing 0.4 per cent. HCl and 1 per cent. pepsin digests *Cysticercus fasciolaris* and makes the egress of the larva easy. In man and animals it has been proved that *C. fasciolaris* is easily hatched in the stomach. The paper [in Japanese] deals also with the histological changes in the liver following invasion by these larvae.

R. T. L.

- FORTIER (L. A.) & GATELY (T. T.). **Encysted Intramuscular Parasites.**—*Southern Med. J.* 1928. Mar. Vol. 21. No. 3. pp. 190–192. With 3 text figs. [6 refs.]

Two skiagrams are given illustrating a case of generalized infection with cysticerci which have become calcified. The parasite was afterwards examined by Dr. M. COURET and identified as *C. cellulosae*. The faeces were negative for ova, but as a young girl the patient had been treated in Louisiana for tapeworm.

R. T. L.

- POISSON (A.) & RANDIAMBELONA. Note sur la cysticercose bovine à Madagascar. [**Bovine Cysticercosis in Madagascar.**]—*Bull. Soc. Path. Exot.* 1928. Mar. 14. Vol. 21. No. 3. pp. 272–274.

Cysticercus bovis is fairly prevalent in the west and south west regions of Madagascar. In many cases calcification occurs. The scolex resembles that described under the name *T. africana* von Linstow 1900 *tonkinensis* Railliet and Henry 1905.

R. T. L.

- TSUYUKI (Kan). [Experimental Studies on the Route of Invasion of *Sparganum mansoni* in the Host's Body.]—*Aichi Igakkwai Zasshi* (*Jl. of Aichi Med. Soc.*) 1927. June. Vol. 34. No. 7. [Summarized in *Japan Med. World*. 1928. Feb. 15. Vol. 8. No. 2. p. 44.]

Sparganum mansoni were seen experimentally to enter the anus and vagina of frogs, guineapigs and white rats and subsequently to invade the hosts. This observation may have some bearing on natural invasion and problems of prevention.

R. T. L.

- BROWN (H. W.). **A Quantitative Study of the Influence of Oxygen and Temperature on the Embryonic Development of the Eggs of the Pig Ascarid (*Ascaris suum* Goeze).**—*Jl. Parasit.* 1928. Mar. Vol. 14. No. 3. pp. 141–160. With 8 graphs. [8 refs.] [School of Hygiene & Public Health, Johns Hopkins Univ., Baltimore, Md.]

Certain phases in the general problem of the effects of oxygen and temperature on the different stages of development of *Ascaris* eggs have been carefully studied and it has been shown that some of the prevailing conceptions on the oxygen utilization by *Ascaris* eggs are not well founded. Supersaturation of water with oxygen does not, in fact,

hasten egg development. With *Ascaris suum* eggs it has been found that development is very regular at both 21° C. and 30° C. in media saturated with atmospheric oxygen (approximately 6.4 cc. and 5.2 cc. of oxygen per litre respectively). Development is two and a half times as rapid at 30° C. as at 21° C. Each stage of development is hastened by this rise in temperature. No one stage consumes more oxygen than another. The lower consumption at 21° C. is due to the slower development. A single *Ascaris* egg consumes about 0.0000025 cc. of oxygen during its development. Eggs can completely exhaust oxygen from their culture medium. Embryonic development proceeds normally in media deprived of as much as one half of the oxygen found in water saturated with atmospheric oxygen at 30° C. Development is retarded about 30 per cent. in media with 1.3 to 1.8 cc. of oxygen per litre and 50 per cent. in media with 1.1 cc. at 23° C.

Oxygen pressures do not hasten development and when sufficiently great may be lethal to the early stages.

R. T. L.

CALDWELL (Fred C.) & CALDWELL (Elfreda L.). **Preliminary Report on Observations on the Development of Ova of Pig and Human *Ascaris* under Natural Conditions, and Studies of Factors influencing Development.**—*Jl. Parasit.* 1928. June. Vol. 14. No. 4. pp. 254–260. [5 refs.] [Field Research Lab., Internat. Health Division, Rockefeller Foundation, Andalusia, Alabama.]

A method has been devised by which it is possible to isolate *Ascaris* eggs from the soil for quantitative studies. Antiformin solution is followed by sugar of high specific gravity which floats the eggs. These are removed from the surface by a small vial. The influence of sunlight, heat, drying, moisture, low temperature and individual variations was observed. The ova of *Ascaris* in pigs and in man show variations in development and resistance to heat, which suggests that there is a biological difference between them. Desiccation is the greatest lethal factor. Hence temperature, humidity, plant and animal life which tend to hasten or retard drying are of importance in the epidemiology of ascariasis where soil pollution is present. High temperatures may be offset by specially favourable conditions in the shade.

R. T. L.

SMIRNOV (G.) & GLASUNOV (M.). **On Blood Changes of Guinea-Pigs after First and Repeated Invasion with *Ascaris* Larvae. (Experimental Study).**—*Rev. Microbiol. et Epidémiol.* 1928. Jan. Vol. 7. No. 1. English summary pp. 141–142. [In Russian pp. 69–93. With 18 text figs. Numerous refs.]

After invasion with *ascaris* larvae the curve of erythrocytes descends constantly and the maximum fall is reached on the 10–14th day. The erythropenia attains 43 per cent. of its initial figure. The quantity of haemoglobin decreases from 5 to 60 per cent. The anaemia is the type of oligochromemia with a lowered colour index. These changes follow the loss of blood due to haemorrhages in the lungs. From the 4th to the 6th day the leucocytosis increases, attaining to 25–30,000 at the 7th to 10th day of the experiment. There is a progressive fall of

lymphocytes. There is constantly an eosinophilia which reaches a maximum on the 10th to 14th day. Only after repeated invasions does the liver show numerous encapsulated larvae.

R. T. L.

MARTIN (H. M.). [**Studies on the "Ascaris lumbricoides."**—*Agric. Exp. St. Nebraska. Bull.* 37. 1926. Dec. pp. 1-78. [Summarized in *Bull. Inst. Pasteur.* 1928. July 31. Vol. 26. No. 14. pp. 658-659.]

The resistance which pigs develop to ascaris infection is due to age, not to acquired immunity. Experiments show that the pig cannot be infected with ascaris eggs from human sources and there appears to be little doubt that the *Ascaris lumbricoides* of man and *Ascaris suilla* of the pig are physiologically distinct, though morphologically indistinguishable. The eggs become embryonated in 10 days at 31°-34° C. while at -5° C. to +10° C. in a dry medium they can survive for more than 2 years and in damp for more than 4 years, when they can induce pulmonary symptoms in a guineapig.

R. T. L.

RICO (J. Toscano). L'action de la naphthaline et de quelques-uns de ses dérivés sur l'*Ascaris lumbricoides*. [**Action of Naphthalene and Some of its Derivatives on *A. lumbricoides*.**]—*C.R. Soc. Biol.* 1927. Oct. 13. Vol. 97. No. 26. pp. 880-883. With 1 text fig. [11 refs.] [*Pharmacol. & Therap. Inst., Faculty of Med., Lisbon.*]

Using as the immersion fluid Rhode-Saito's liquid (pH 6.4 at 37° C.) to which 2 grams per 100 of ox bile has been added to increase the solubility of the drugs tested, the author has examined the effect of naphthalene, bromonaphthalene, and other derivatives, on the activity of *Ascaris lumbricoides* in vitro.

R. T. L.

MANALANG (C.). **Ascariasis: Relation between the Number of Ova per Gram of Formed Stool and the Number of Female Worms harbored by the Host.**—*Philippine J. Sci.* 1928. Jan. Vol. 35. No. 1. pp. 23-29. [2 refs.] [*Philippine Health Service, Manila.*]

Ascaris egg counts were made on 11 clinical cases and 11 autopsies. The clinical cases showed unreasonable discrepancies between pre-treatment and post-treatment counts in some cases. The egg factor per gram of stool, "formed basis" per female was about 1,420. In 6 cases with intestinal pathology, the average was 1,460. Mechanical and biological factors are held to be the probable reason for the variation in cases. 9 tables accompany the text.

R. T. L.

IIO (Arata). [**Studies on the Body Fluid of the Human Ascaris.**]—*Kyoto Igakkuai Zasshi (Jl. of Kyoto Med. Soc.)* 1927. Apr. Vol. 24. No. 4. [Summarized in *Japan Med. World.* 1928. Jan. 15. Vol. 8. No. 1. p. 19.]

The body cavity fluid of *Ascaris lumbricoides* from man is highly toxic, inducing vomiting, diarrhoea, sometimes bloody stool, dyspnoea, cardiac disturbances, fainting and spasm. 0.5 cc. per kilogram of body weight will kill the dog and the guineapig, while 1.0 cc. per kilo will kill the rabbit. P.M. findings show congestion of the viscera, especially of the kidneys and intestine, emphysema of the lungs, haemorrhage in the thymus, etc. The fresh fluid, which is slightly acid with a pH of 6-7, has no haemolytic action, but an old specimen has marked haemolytic power and retards blood coagulation.

R. T. L.

NISHIMURA (Keisuke). [On the Antitriptic Power of the Extracts of the *Ascaris*.]—*Chosen Igakkwai Zasshi* (*Jl. Korean Med. Soc.*) 1928. Jan. No. 84. [Summarized in *Japan Med. World*. 1928. Apr. 15. Vol. 8. No. 4. pp. 100-101.]

Glycerin-water extracts and ether extracts of ascaris have a marked antitriptic action. Alcoholic extracts have no action.

R. T. L.

DUTTA (Jagadish Chandra). *Ascaris Infection simulating Bright's Disease*.—*Indian Med. Gaz.* 1928. June. Vol. 63. No. 6. p. 330. [Raja Ali Tea Estate, Assam.]

A woman with general anasarca, dyspnoea, no appetite and a continuous feeling of heaviness in the abdomen, was at first treated as a case of Bright's disease. Treated with oil of chenopodium and carbon tetrachloride mixture, followed by salt, she passed in five days 500 roundworms, and quickly became fit and well.

R. T. L.

WYSS (Hans). Chirurgische Komplikationen der Ascaridiasis. [*Surgical Complications of Ascariasis*.]—*Schweiz. Med. Woch.* 1928. May 19. Vol. 58. No. 20. pp. 502-506. With 3 text figs. [33 refs.] [Canton Hospital, Aarau.]

Clinical details are given of two surgical cases complicated by the presence of ascarids. In one case there was volvulus of the ileum, with perforation of the infarcted bowel and escape of ascarids into the peritoneal cavity. In the other, the worms were found in the peritoneal cavity following perforation of a gangrenous bowel wall.

R. T. L.

HAMID (M.). [Grave Symptoms caused by *Ascaris lumbricoides*.]—*Egyptian Med. Rev.* 1927. Apr. No. 4. pp. 266-270. [In Arabic.]

The clinical records are given of three cases. In the first there was severe colic, nausea and shock. The abdomen was tympanitic, temperature 36° C, pulse 52. Laparotomy disclosed the fact that a loop of the ileum was tightly packed with Ascarids. One hundred and one worms were removed and 14 others were passed later, after the administration of santonin. In the second case there was an inguinal hernia. When the clips were removed after operation, five ascarids were found in the wound and a few days later there were six more. In the last case laparotomy was performed for appendicitis. The appendix was normal, however. There was a tense swelling in the ileocaecal region due to worms. These were massaged into the caecum and a great many were passed when the patient subsequently received chenopodium.

R. T. L.

SIVASAMBANDAN (R.). Notes on Two Interesting Cases.—*Malayan Med. Jl.* 1928. Mar. Vol. 3. No. 1. p. 64.

Of these two cases the first is a case of beta-naphthol poisoning caused, it is suggested, by the surreptitious use of alcohol. The second case was one of perforation of the oesophagus by *Ascaris lumbricoides*. At post mortem two large roundworms were found alive in the left pleural sac. They had escaped from the oesophagus just above the diaphragm through an opening 1 cm. long vertically and $\frac{1}{2}$ cm. broad transversely.

R. T. L.

SANDGROUND (J. H.). **Some Studies on Susceptibility, Resistance, and Acquired Immunity to Infection with *Strongyloides stercoralis* (Nematoda) in Dogs and Cats.**—*Amer. Jl. Hyg.* 1928. July. Vol. 8. No. 4. pp. 507-538. [16 refs.] [Harvard Med. School, Boston, Mass.]

Strongyloides stercoralis from human cases has been successfully transmitted to dogs and cats. Cats are the more susceptible, and there are degrees of individual susceptibility within the species. In dogs the duration is longer than in cats. Infections are eliminated spontaneously and the animals are refractory to reinfection. In dogs this acquired immunity lasts more than six months. The susceptibility of infected animals to super-infection is lost after a few weeks, and the animal becomes refractory to super-infection before the primary infection has entirely disappeared. This immunity differs from natural immunity and is specific. In immune animals it would appear that the larvae actually penetrate the skin and pass through the blood stream and lungs, reaching the intestine, but they are overcome before attaining sexual maturity. Blood from immune animals does not confer immunity. Eosinophilia plays little part in the mechanism of immunity. Previous infection with *Strongyloides fulleborni* did not prevent subsequent infection with *Strongyloides stercoralis*.

R. T. L.

NISHIGORI (M.). **The Factors which influence the External Development of *Strongyloides stercoralis* and on Autoinfection with this Parasite.**—*Taiwan Igakkai Zasshi* (*Jl. Med. Assoc. Formosa*). 1928. Apr. No. 277. English summary pp. 31-33. [In Japanese. With 33 figs. on 3 plates.] [Govt. Med. College, Taihoku, Formosa, Japan.]

The conditions which produce sexually mature free-living forms in *Strongyloides stercoralis* are sufficient nutriment and humidity at a temperature of 28-34° C. The reaction of the culture medium must be neutral, or slightly alkaline and the supply of oxygen must be sufficient. When the larvae evacuated in the faeces are kept under unsuitable conditions, a great number become transformed directly into filariform larvae. They may even do so before evacuation, and penetrating the mucosa of the large intestine produce auto-infection. The direct and indirect filariform larvae are readily distinguishable. The latter are about 0.016 mm. longer than the former and the genital premordium is smaller, consisting of only 3 to 4 cells as compared with 12 to 22 cells in the former. Constipation is the most important factor in auto-infection. If young larvae remain in the alimentary canal for more than 24 hours they will change directly into filariform larvae and penetrate the mucosa. The same changes may occur when the bowel contents are unsuitable for the life of the larvae. If the mucosa of the large intestine is ulcerated, even young larvae may penetrate into the intestinal wall and after direct metamorphosis produce auto-infection. The author describes the four main routes taken by the larvae in auto-infection. Unless the infection is exceptionally heavy it does not seriously affect the host, but in auto-infection ulcers of the mucous membrane, chronic peritonitis, pleuritis, bronchitis and even parasitic pneumonia may result. [Based on abstract of Japanese.]

R. T. L.

BACHMAN (George W.). **An Intradermal Reaction in Experimental Trichiniasis. Preliminary Report.**—*Jl. Preventive Med.* 1928. Mar. Vol. 2. No. 2. pp. 169-173. With 1 text fig. [1 ref.] [Dept. Hyg. & Bact., Univ., Chicago.]

A local skin reaction, specific in character, followed the intracutaneous injection of *Trichinella* protein in twelve trichinosed rabbits. The typical skin reactions appeared as early as the second day after feeding with trichinosed meat. The method of preparing the antigen has already been described in the *Journal of Preventive Medicine*, 1928, Vol. 2, p. 35 [ante, p. 470].

R. T. L.

MANALANG (C.). **Trichuriasis: Relation between the Number of Ova Per Gram of Formed Stool and the Number of Female Worms harbored by the Host.**—*Philippine Jl. Sci.* 1928. Jan. Vol. 35. No. 1. pp. 11-22. [1 ref.] [Philippine Health Service, Manila.]

The whipworm eggs were carefully counted in 4 clinical cases and 18 fresh cadavers. In the clinical cases there were unreasonable variations between the pre-treatment and post-treatment counts. The *Trichuris* egg "factor" was found to be about 310 ova per gram of "random" stool, formed basis, per female worm. The variations observed in the author's counts appeared to be influenced by mechanical and biological factors. A large number of tabular statements clarify the text.

R. T. L.

TROISIER (P.), DESCHIENS (R.), LIMOUSIN (H.) & DELORME (M.). **L'infestation du chimpanzé par un nématode du genre *Hepaticola*. [Infestation of Chimpanzee with the Nematode *Hepaticola*.]**—*Bull. Soc. Path. Exot.* 1928. Mar. 14. Vol. 21. No. 3. pp. 221-222.

A naturally acquired infection of the liver with eggs of *Hepaticola* is recorded in an anthropoid ape from Kindia in French West Africa. The only known species *H. hepatica* is normally a parasite of rats and mice, but has been found in rabbit and hare and, on one occasion, in man.

R. T. L.

DE CARVALHO (Onelio). **Frequencia do "Enterobius vermiculares" nas crianças do Districto Federal. [Frequency of *E. vermicularis* in Children in Brazil.]**—*Sciencia Med.* 1928. Mar. Vol. 6. No. 3. pp. 117-118.

Of 130 children especially examined for *Oxyuris vermicularis* no less than 29, i.e., 22.4 per cent., were found infected. The author draws attention to the very varied percentages reported by different workers.

R. T. L.

CLUVER (Eustace). **Ankylostomiasis: Occurrence and Possibility of Spread in the Union of South Africa.**—*Jl. Med. Assoc. South Africa.* 1928. June 23. Vol. 2. No. 12. pp. 319-323.

Widespread anaemia and low mentality among children in Northern Transvaal suggested a prevalence of hookworm infection which laboratory examinations of European children have so far failed to confirm. Routine examinations have shown that 43 per cent. of Portuguese East African native employees and 13.4 per cent. of British South

African employees are carriers. It appears that infestation occurs elsewhere in the Union as 27 of the South African natives had not been employed on the mine for longer than 3 months. The European cases discovered on the Witwatersrand all appear to have been infested in the mines. Common salt is used once a week on latrine floors and other places likely to be infected, and walls, roofs and seat are washed with a 20 per cent. solution. Buckets have $\frac{1}{2}$ in. layer of salt on bottom and top prior to removal from the latrine. The soil in and about latrines was found to be entirely free from larvae eight days after treatment although previously it swarmed with larvae.

R. T. L.

ORENSTEIN (A. J.). **The Diagnosis and Treatment of Ankylostomiasis.**—*Jl. Med. Assoc. South Africa*. 1928. June 23. Vol. 2. No. 12. pp. 323-324.

As persons infected with hookworm have been recently noticed among new arrivals at the Witwatersrand mines from Zululand, the Transkei, and Basutoland the author has put together these notes on diagnosis and treatment of the disease. Although it was recognized among Indian coolies in Natal in 1904, and on the Witwatersrand in 1906, there appears to have been no need hitherto for the medical profession to concern itself much about the disease.

R. T. L.

ESPIÉ (A.) & DUTHU (L.). Contribution à l'étude de l'ankylostomiase dans le sud tunisien. [**Ankylostomiasis in South Tunis.**]—*Arch. Inst. Pasteur de Tunis*. 1928. Mar. Vol. 17. No. 1. pp. 79-82. [1 ref.]

An examination of the stools of 200 persons from the Oasis of Gafsa showed that 97.5 per cent. harboured parasites. The species incidence in the 200 persons was as follows: Ascaris 162, Trichuris 158, Ancylostoma 51, Trichostrongylus 16, Hymenolepis 4, Oxyuris 2, *Strongyloides stercoralis* 1, Taenia 1. This enquiry establishes definitely the occurrence of hookworm in the Oasis of Gafsa. This is not surprising in view of the considerable amount of traffic between Gafsa and Tozeur, a heavily infected centre.

R. T. L.

PHILIP (C. R.) & MACLENNAN (N. M.). **Personal Experiences of Hookworm Infection.**—*Kenya & East African Med. Jl.* 1928. June. Vol. 5. No. 3. pp. 93-96.

Two medical officers concerned in the hookworm campaign in the Digo district became infected on two successive occasions. The actual method of infection is unknown but the district is grossly infected and 95 per cent. of the population are carriers. The symptoms were similar in the two cases, viz., exhaustion with early sleepiness, dyspnoea, pyrexial attacks, constipation with flatulence and irregularity, vague symptoms of discomfort in the epigastrium, mental irritability with inability to concentrate, praecordial pain and pain over the apex of the right lung. Treatment cut short the disease before many physical

signs became established, but there were anaemia, heart murmurs, pyorrhoea, enlargement of the heart, puffiness of the features, increased vocal resonance and fremitus at the right apex and chronic cachexia. There was a marked eosinophilia. Immediately after treatment the health rapidly improved regaining the normal in about a week's time, when the eosinophil count gave 6 per cent. Reinfection took place some weeks after treatment and the eosinophils rose from 1 per cent. to 14 per cent. in a few days. The symptoms were not so severe.

R. T. L.

QUEMENER (E.). Contributions à l'étude de la symptomatologie de l'ankylostomiase. [**Symptomatology of Ankylostomiasis.**]—*Rev. Méd. et Hyg. Trop.* 1928. Mar.-Apr. Vol. 20. No. 2. pp. 36-38.

Eighty per cent. of those affected with hookworm can be detected clinically by the expert. The author divides the symptoms into *Principal*, viz.: (a) pain in the epigastrium; (b) diarrhoea; (c) reduction in the quantity of urine; (d) earthy yellowish hue; (e) anaemia. *Secondary*: (a) puffiness of the face, oedema of the lower limbs, abdomen and in advanced cases ascites, hydrothorax, hydropericardium; (b) hypertrophy of liver and spleen, frequently jaundice; (c) palpitations; (d) pleuro-pneumonia; (e) renal symptoms; (f) anorexia, vertigo and psychasthenia.

There is no undue temperature except where the lung or liver is involved. Differential diagnosis includes a consideration of nephritis, cancer, dysentery, and the parasitic infections, tuberculosis, syphilis, malaria and especially beriberi.

R. T. L.

KOBAYASHI (K.) **Morphological Differences among Mature Larvae of *Necator americanus* and Three Other Species of Ankylostomidae.**—*Taiwan Igakkai Zasshi* (Jl. Med. Assoc. Formosa). 1928. Feb. No. 275. English summary pp. 16-18. [In Japanese. With 2 plates & 2 text figs.] [Govt. Med. College, Taihoku, Formosa.]

Morphological differences exist between mature larvae of *Necator americanus* and those of three other species of Ankylostomidae. During the first 3 days after encystment the larva of *A. duodenale* is much more active than that of *N. americanus*. The body of the *A. duodenale* larva is the bigger. In *Necator* the transverse striations of the cuticle of the larvae are the more distinct. The head of an *A. duodenale* larva is large and flat, that of *necator* larva is small and round. A spear is seen in the mouth and anterior end of the oesophagus. In *Necator* larvae with a high power the mouth cavity is filled with highly refractile hyaline substance in the form of a spear with a broad bifracted anterior end and an enclosed narrow line, whereas in *Ancylostoma* there are two narrow longitudinal lines separated by a wide space.

The genital anlage is on the anterior half of the intestine in *Necator*; in the posterior half in *Ancylostoma*. The tail of *Ancylostoma* larvae is longer and slenderer than that of *Necator* larvae and is pointed in *Necator*, blunt in *Ancylostoma*. Small morphological differences are noted also during the periods 3-15 days and 3 to 4 weeks after encystment. The larvae of the three species *A. duodenale*, *A. caninum* and

A. braziliense show considerable difference in shape and size of the tail. The transverse striations of the cuticle are most marked in *A. braziliense* while those in *A. caninum* are almost indistinguishable.

R. T. L.

SCHUURMANS STEKHOVEN Jr. (J. H.). **The Nemas Anchylostoma and Necator. II. New Researches on the Larvae of *Anchylostoma duodenale* Dub. and *Necator americanus* Stiles.**—*Proc. Roy. Acad. Amsterdam*. 1927. Vol. 30. No. 5. pp. 581-593. With 21 text figs. [4 refs.]

The present investigations deal with the morphology of the third stage, ensheathed larva, of *Anchylostoma* and *Necator*. The larvae were isolated from soil cultures by using wet hairy tomato seeds on which they crept and thus could be transported easily on to a slide. The main differences lie in the structure of the head and in the lips, papillae and amphids, in the covering of the apical end of the oesophagus, the presence or absence of the anterior oesophageal bulb, in the structure of the posterior oesophageal bulb, the structure of the salivary glands, in the sphincter between the oesophagus and intestine, in the structure and shape of the excretory apparatus, in the shape of tail and sheath and in the distribution of the transverse striations on the skin.

R. T. L.

GARIN (Ch.), DOUBROW (S.) & MOUNIER (H.). Quelques particularités dans l'évolution de l'ankylostomose (110 observations). [**Points in the Development of Ankylostomiasis.**]—*C.R. Soc. Biol.* 1928. Jan. 13. Vol. 98. No. 1. pp. 44-45.

This brief note states that the authors have treated 110 cases for hookworm and have collected from them 40 worms of which only three, one male and two females, were *Necator americanus*. The number of eggs varied from 4 or 5 to more than 3,000 in each preparation made by an enrichment technique based on that of Telemann. The blood changes are somewhat vaguely described.

R. T. L.

MAPLESTONE (P. A.). **The Rate of Loss of Hookworm Eggs from Faeces.**—*Indian Med. Gaz.* 1928. June. Vol. 63. No. 6. pp. 324-326. With 1 chart in text. [4 refs.] [Calcutta School of Trop. Med., Calcutta.]

There is a fairly rapid and steadily progressive loss of hookworm eggs from the first to the sixth day in storage of faeces. During the first three or four days eggs containing larvae are often encountered while in a few cases free larvae may be seen although the majority of the eggs are still normal and undeveloped. From about the 4th day onward, definitely degenerating eggs are found. These results occurred in sealed tins free from air and in tins with a layer of air between the surface of the faeces and the lid. The tins used were identical with those with which CHANDLER carried out his Indian survey in 1928.

R. T. L.

OBA (T.). **On the Morphological Changes of the Blood in Infection with *Ancylostoma duodenale* and *Necator americanus*, especially on the Eosinophilia in these Cases.**—*Taiwan Igakkai Zasshi* (Jl. Med. Assoc. Formosa). 1928. May. No. 278. English summary p. 36. [In Japanese.] [Govt. Med. College, Taihoku, Formosa, Japan.]

A comparative study of the blood changes, especially eosinophilia, has been made in 12 experimental infections in man with larvae of *Ancylostoma* and *Necator*. In both eosinophilia is the most notable blood change. A slight eosinophilia occurs soon after infection. In the *Ancylostoma* cases the maximum number of eosinophile cells amounted to 29–37 per cent. of the whole leucocyte count and drops during a period of six months to 17–15 per cent. In *Necator* infection the maximum number of eosinophiles formed 13·2–15·4 per cent. of the total leucocytes. This decreased to 5–10 per cent.

R. T. L.

NODA (Y.). **On the Resistance of the Eggs and the Mature Larvae of *Ancylostoma duodenale* against the Halogen-Group, especially Iodine.**—*Taiwan Igakkai Zasshi* (Jl. Med. Assoc. Formosa). 1928. July. No. 280. English summary p. 50. [In Japanese.] [Govt. Hosp., Karenko, Japan.]

The effects of iodine, chlorine and bromine have been tested at 37° C. against the eggs and larvae of *Ancylostoma duodenale*. In iodine 0·014 per cent. they died within 20 seconds, in 0·0125 per cent. in 4 to 9 minutes. In chlorine 0·15 per cent. death was immediate and 0·1 per cent. killed in 7 minutes to 2 hours. Bromine 1 per cent. was immediately fatal and 0·75 per cent. acted in from 5 minutes to 2 hours.

R. T. L.

HERRICK (C. A.). **A Quantitative Study of Infections with *Ancylostoma caninum* in Dogs.**—*Amer. Jl. Hyg.* 1928. Mar. Vol. 8. No. 2. pp. 125–157. With 2 figs. [13 refs.] [Dept. Zool., Univ., Wisconsin, and School of Hygiene & Public Health, Johns Hopkins Univ., Baltimore, Md.]

Using *Ancylostoma caninum* experimentally in dogs the author found that the important factors affecting the egg-worm ratio were: (1) age of the worms; (2) proportion of worms in copula; (3) proportion of males and females. The numbers of eggs produced increased very considerably with the age of the female worms so that in all estimates of worm numbers from egg counts the age of the worms must be considered. The average number of eggs per day is a better measure of infection than of eggs per gram. Older dogs were more resistant than young. No increase in resistance could be demonstrated in dogs previously infected when all the worms from the previous infections had been removed with anthelmintics, although in certain cases where residual infections occurred there seemed to be increased resistance to a superimposed infection.

R. T. L.

SCOTT (J. Allen). **An Experimental Study of the Development of *Ancylostoma caninum* in Normal and Abnormal Hosts.**—*Amer. J. Hyg.* 1928. Mar. Vol. 8. No. 2. pp. 158-204. With 6 text figs. [20 refs.] [School of Hygiene & Public Health, Johns Hopkins Univ., Baltimore, Md.]

The detailed study reported in this paper was made for the purpose of determining the conditions necessary for the development of *Ancylostoma caninum* in the dog. Infective larvae were administered orally to dogs, cats and rats and particular attention was given to the early stages of development. Dogs and cats become more resistant with age, but cats were never so easily infected as dogs, even when very young, and sexual maturity was attained more slowly. Rats could not be experimentally infected. By using the Baermann apparatus it was demonstrated that in each host a certain number of worms remained undeveloped and identical with the infective forms. They could be recovered from the body several weeks after administration. When again administered to other hosts they could still be infective. Evidence was obtained that after oral infection development of the worms could follow without migration through the lungs. It seems improbable, from these studies, that the chief cause of insusceptibility is the action of any lethal agent or the lack of sufficient or proper food or of a stimulating agent in the susceptible host and of an inhibiting agent in the resistance host. The combination of factors necessary for parasitism cannot yet be specified.

R. T. L.

LANE (Clayton). **A Simple Hookworm Larvicide.** [Correspondence.]—*Lancet.* 1928. May 19. p. 1043. [1 ref.]

CAROZZI (L.). **The Problem of Ankylostomiasis.** [Correspondence.]—*Ibid.* June 16. p. 1251. [1 ref.]

LANE (Clayton). **Recent Knowledge of Hookworm Disease.** [Correspondence.]—*Ibid.* June 23. pp. 1301-1302.

Attention is drawn to LAMBINET's early work in the Liège coal-mines, showing that 3 per cent. salt solution was the lowest concentration which prevented the development of hookworms to the infective stage. No development occurred in a stool rich in hookworm eggs when covered with salt. This simple method for the eradication of hookworm from mines was not, however, received by LAMBINET's contemporaries with enthusiasm. Twenty-two years later Dr. W. O. FISCHER appears to have formed the same conclusions as LAMBINET as to the value of common salt.

An editorial note to the effect "that we possess no convenient resumé in a single cover of the immense mass of recent knowledge regarding hookworm disease in various parts of the world" brought a letter from Dr. Carozzi drawing attention to the Bibliography on Hookworm published by the International Health Board in 1922 and to a publication from the International Labour Office. Col. Clayton Lane shows that this is deplorably short of the admirable standard set by the League's publications—e.g., on malaria.

R. T. L.

GILL (C. A.). **A Simple Hookworm Larvicide.** [Correspondence.]—*Lancet*. 1928. July 7. p. 38.

In the Khewra Salt Mines in India the unhygienic conditions and the great heat and humidity are ideal for the spread of hookworm, but this is prevented by the presence of the salt. The author agrees that the common use of salt in mines infected by hookworm would be a simple remedy and he suggests that the use of common salt should prove equally valuable on the surface, especially in the vicinity of latrines, where the danger of infection is very great.

R. T. L.

LAMBERT (S. M.). **Mass Treatment for Hookworm Disease justifies itself.**—*Jl. Trop. Med. & Hyg.* 1928. May 15. Vol. 31. No. 10. pp. 113–115.

The history of hookworm disease in Fiji is recounted. In 1916 it was shown that 96 per cent. of 131 persons (from Suva Gaol and Rewa districts) were infected with an average of 194 worms. Intensive measures were commenced in 1917. In 1921 carbon tetrachloride treatment was introduced and in 1922 50,000 treatments had been given in Fiji. In March 1928, over three years after the last treatment, clinical hookworm disease is still rare in Fiji. Hookworm has been controlled and has been eliminated as an economic factor. It will never be eradicated until the time comes when these backward people have acquired a sanitary conscience.

R. T. L.

MARTIN (S. Haviland). **Hookworm Disease in Korea. With Special Reference to its Treatment.**—*China Med. Jl.* 1928. Mar. Vol. 42. No. 3. pp. 187–191. [5 refs.]

In Korea hookworm is second only to tuberculosis in its importance to the health of the people. Both *Ancylostoma duodenale* and *Necator americanus* occur. By the Stoll method and by counting the worms passed by 50 in-patients, the proportion of *Ancylostoma* to *Necator* was determined approximately as 2:1. All the cases were mixed infections. To remove *Ascaris* as well as these two species a mixture known as the "Severance hookworm mixture" was adopted. It contains 10 parts of carbon tetrachlorid and one part of 0l. chenopodium. It can be given as 0.2 gm. for each year up to 15 years. Over 3 grams is not safe. It should not be repeated within a week nor given to cases of heart or kidney disease. From 312 cases treated the number of worms recovered ranged from one to 29. The author believes that in Korea a great deal of the infection is food-borne, particularly due to "kimchi" and other vegetables since almost half of his cases came from the city of Seoul and were never barefoot.

R. T. L.

BROSIOUS (O. T.), PEON (I. E.) & CARROLL (R. L.). **Tetrachlorethylene in Uncinariasis. A Preliminary Report.**—*Sixteenth Ann. Rep. Med. Dept. United Fruit Company, Boston, Mass.* 1927. pp. 183–184. [1 ref.] [United Fruit Co. Hosp., Almirante, Panama.]

A preliminary note is published of the results of treatment of 24 hookworm carriers with tetrachlorethylene. All but 3 of the patients

had a single dose each of 3 cc. The reactions to the drug were as follows: Severe 2; moderate 6; mild 13; none 3. The symptoms noted were, dizziness 11; dizziness and abdominal pains or cramp 6; abdominal pains or cramp only 3; nausea 1. In one case vomiting followed the taking of the drug. The largest number of worms expelled by one individual was 615. The average was 54 per case. An average of 2 ascaris and 0.5 whipworm per case were found also. 91.7 per cent. of the series of cases were negative for ova after treatment.

R. T. L.

LEGER (Marcel). Traitements comparés de ankylostomiase. [**Comparison of Treatments for Hookworm.**]—*Rev. Méd. et Hyg. Trop.* 1928. Mar.-Apr. Vol. 20. No. 2. pp. 38-40.

The cases compared in this paper were treated in French Guiana in 1917. Neither oil of chenopodium nor carbon tetrachloride were tested. A few details are given of the methods used and the results obtained with thymol, eucalyptol, niaouli, essence of turpentine, beta-naphthol and extract of male fern.

R. T. L.

GARIN (Ch.), DOUBROW (S.) & MOUNIER (H.). La résistance globulaire dans l'ankylostomose. [**Resistance of Erythrocytes in Ankylostomiasis.**]—*C.R. Soc. Biol.* 1928. May 18. Vol. 98. No. 15. pp. 1337-1338.

In eleven cases of ankylostome anaemia there were considerable variations in the number and in the haemoglobin index of the red cells but their resistance remained within normal limits.

R. T. L.

GARIN (Ch.), DOUBROW (S.) & MOUNIER. De la viviparité postvitale chez l'ankylostome. [**Viviparity in the Ankylostome.**]—*C.R. Soc. Biol.* 1928. June 8. Vol. 99. No. 19. p. 79.

Where female ankylostomes have died in the alimentary canal it is possible, so the authors suggest, that the eggs undergo development within the body and afterwards pass as rhabditiform embryos into the intestinal contents. If these became infective an internal cycle of the parasite would be possible.

R. T. L.

HAYES (T. H.). **Hookworm as a New Health Problem in St. Croix.**—*U.S. Nav. Med. Bull.* 1928. Apr. Vol. 26. No. 2. pp. 281-292.

The importation of labourers from Porto Rico where malaria and hookworm are rife into St. Croix where these diseases are of extreme rarity presents a new health problem of great importance to St. Croix. The author makes useful suggestions towards its solution.

R. T. L.

RITCHIE (T. Russell). **The Control of Hookworm in a Native Community.**—*Med. Jl. Australia.* 1927. Nov. 19. Supplement No. 13. pp. 397-400.

A popular account of the work being carried out by the chief health officer in the control of hookworm in Samoa.

R. T. L.

YAMAGUCHI (Masamichi) & YAMAGUCHI (Misao). [A Contribution to the Knowledge of Experimental Studies on the Infection Route of Ancylostoma. Results of the Re-Examination of the Per-Os Infection Experiment of Miyagawa, Yokokawa and Asada (Concluded).]—*Tokyo Iji-Shinshi (Tokyo Med. News)*. 1928. Mar. No. 2593. [Summarized in *Japan Med. World*. 1928. May 15. Vol. 8. No. 5. p. 134.]

Experiments show that when ankylostome larvae are administered orally they attain their full development in the intestinal tract without undergoing any other migration as others have supposed. The pulmonary route is only a means by which larvae entering the skin find their way into the intestine and is not necessarily involved in the biological or developmental processes of the parasite.

R. T. L.

MIWA (Fujio). [On the Immunization with the Ancylostoma.]—*Gun-I-Dan Zasshi (Jl. Army Med. Corps)*. 1928. Jan. No. 175. [Summarized in *Japan Med. World*. 1928. May 15. Vol. 8. No. 5. p. 127.]

A saline emulsion of dog ankylostomes did not immunize dogs; 0.4 cc. of the 1 per cent. emulsion was toxic, for it killed a mouse of 10 gm. weight.

R. T. L.

MANSFIELD-ADERS (W.). **Notes on Malaria and Filariasis in the Zanzibar Protectorate.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1927. Nov. 25. Vol. 21. No. 3. pp. 207–214. With 1 map.

Filariasis and elephantiasis are well-known infections in Zanzibar. 26.3 per cent. of 645 adult Africans showed *Microfilaria bancrofti* in the night blood. Engorged female *Culex fatigans* were captured and fed daily for 12 days on dates moistened with water. They were then dissected and the proboscis carefully examined for infective larvae. 265 out of 1,300 (i.e., 20.3 per cent.) were found to be parasitized. In dissections of *Anopheles costalis* and *A. funestus* for malaria parasites larvae of *Mf. bancrofti* were noted in the thoracic muscles and proboscis.

R. T. L.

KORKE (Vishnu T.). **Observations on Filariasis in Some Areas in British India. Part II.**—*Indian Jl. Med. Res.* 1928. July. Vol. 16. No. 1. pp. 187–198. With 2 text figs. (1 map) and 1 folding plate. [2 refs.] [Central Research Inst., Kasauli, India.]

From a detailed study of the area, Korke concludes that filariasis has considerable prevalence in Bihar and Orissa and is uniformly distributed in the region, in which paddy is the main crop. The vector in the Gaya district was found to be *Culex fatigans* and in the months of February and March, 15 per cent. of these mosquitoes were found naturally infected. In the Puri township 12 per cent. of the mosquitoes were also infected, but the species of mosquito was not specifically determined.

R. T. L.

DAVIS (Nelson C.). **A Study on the Transmission of Filaria in Northern Argentina.**—*Amer. Jl. Hyg.* 1928. May. Vol. 8. No. 3. pp. 457–466. With 4 text figs. [8 refs.]

An experimental study on the transmission of *Microfilaria lucumana* (? *M. ozzardi*) practically ruled out the Hemiptera (Cimex and Triatoma)

as transmitting agents. Four mosquitoes out of 117 fed on a carrier were found infected. In each case the head and proboscis were not invaded. Two of the successes were with *Anopheles tarsimaculatus*, one with *A. albitarsis* and one with *Aedes aegypti*. Further experiments, e.g. with *Simulium*, are suggested.

R. T. L.

ENZER (A. J.). **Symptoms associated with a Heavy Infection of *Filaria perstans*.**—*Kenya & East African Med. Jl.* 1928. Apr. Vol. 5. No. 1. p. 28.

Four persons from North Kavirondo, at a place where sleeping sickness is unknown, complained of persistent headaches, loss of strength and feeling of drowsiness. All had enlarged spleens, and large, soft cervical, axillary and femoral glands. Gland puncture revealed *Filaria perstans* in every slide and the centrifuged blood teemed with the parasites. No trypanosomes were found. The cerebrospinal fluid was normal. A fifth case from the lake shore presented similar conditions.

R. T. L.

HARDWICKE (Charles). **Onchocerciasis in Southern Mexico.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1928. Mar. 31. Vol. 21. No. 6. p. 495.

It is stated that Dr. José LARUMBE, Director of the Military Hospital in Oaxaca has recently reported cases of onchocerciasis in isolated areas of that state. The author says "there is no doubt that the disease invaded Mexico by way of Guatemala; its course can be traced along the mountain range of the Sierra Madres, with infected areas in these mountains, from the Guatemalan frontier through the states of Chiapas, Oaxaca and Guerrero."

R. T. L.

ROUSSEL (Botreau). Radiographie du ver de guinée (filare de Médine) après injection intrasomatique de lipiodol. [**Radiography of the Guinea Worm after Injection of Lipiodol.**]—*Bull. Soc. Path. Exot.* 1928. Feb. 8. Vol. 21. No. 2. pp. 103-104. With 4 figs. on 2 plates.

Neither by local injections (with cocaine, formol, chloroform, etc.) nor by general chemotherapy (intravenous injections of novarsenobenzol, tartar emetic, intravenous and intramuscular injections of emetine, ingestion of stovarsol, etc.) has the author been able to treat successfully his patients suffering with guineaworm. In the course of his studies he found that the injection of lipiodol into the body cavity of the worms enabled him to obtain very clear, though not always complete, pictures of the worms in the tissues. Two very fine skiagrams illustrate the text.

R. T. L.

COUTELEN (F.). Contribution aux essais de culture *in vitro* d'embryons de filaires. [Attempts to cultivate Filarial Embryos in Vitro.]—*Bull. Soc. Path. Exot.* 1928. Apr. 18. Vol. 21. No. 4. pp. 316-322. [8 refs.] [Parasit Lab., Faculty of Med., Paris.]

After reviewing the recent literature on the subject the author recounts his personal investigations with *Filaria neglecta* of the frog. In Ponselle's hypotonic fluid at 18° C. the embryos survived for 12 to 15 days, but no morphological changes occurred.

R. T. L.

BAYLIS (H. A.). Notes on Two Gordiids and a Mermithid said to have been Parasitic in Man.—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1927. Nov. 25. Vol. 21. No. 3. pp. 203-206. [5 refs.]

Two *Paragordius areolatus* v. Linstow were "passed" by a native girl in the Gold Coast. *Chordodes capensis* came from a native in British East Africa and a specimen of a *Mermis* worm was forwarded from Queensland and was stated to have been passed by a woman. The question of the actual occurrence of these, and other gordiids and mermithids, as true parasites of man is fully discussed by the author. The paper concludes with a list of the dozen records of gordian worms which have now been reported from man.

R. T. L.

BACIGALUPO (J.). *Periplaneta americana* Fahr., hôte intermédiaire du *Gigantorhynchus moniliformis* Bremser, dans la république Argentine. [*P. americana* as Intermediate Host of *G. moniliformis* in the Argentine.]—*C.R. Soc. Biol.* 1927. Nov. 4. Vol. 97. No. 29. p. 1251. [2 refs.]

The author having failed with the common cockroach experimented with *Periplaneta americana* and succeeded in producing, in 3 out of 38, larvae of *Gigantorhynchus moniliformis* [the common echinorhynchus of rats and mice.]

R. T. L.

DE CAPUA (F.). L'echinococcosi nell' infanzia.—*Pediatrics.* 1928. July 15. Vol. 36. No. 14. pp. 766-775. [31 refs.]

CASAS (Urbano). Un caso de anquilostomiasis en Naval Moral de la Mata (Caceres).—*Med. Países Cálidos.* Madrid. 1928. May. Vol. 1. No. 3. pp. 270-272. [5 refs.]

DA COSTA (S. F. Gomes). Action de quelques substances du groupe des camphres sur l'*Ascaris lumbricoides* du porc.—*C.R. Soc. Biol.* 1928. June 1. Vol. 98. No. 18. pp. 1604-1606. [4 refs.] [Pharmacol. Inst., Faculty of Med., Oporto.]

DÉVÉ (F.). Embolies hydatiques pulmonaires expérimentales.—*C.R. Soc. Biol.* 1928. May 21. Vol. 98. No. 16. pp. 1389-1391. [1 ref.]

GARRONE (Enrico). Appendicite acuta da ascaride lombricoide.—*Policlinico. Sez. Prat.* 1928. Mar. 19. Vol. 35. No. 11. pp. 493-495. [18 refs.]

MURRAY (Florence J.). Ascariasis: a Factor in Diagnosis and Treatment.—*Canadian Med. Assoc. J.* 1928. June. Vol. 18. No. 6. pp. 694-696.

PAVLOVSKY (A. J.), MAHIEU (A.) & DE FILIPPI (J.). Quistes hidáticos del hígado abiertos en los bronquios y bilirragia hidática post-operatoria. Consideraciones clínico-quirúrgicas.—*Arch. Argentinos de enfermedades d. Aparato Digestivo y de la Nutrición.* Buenos Aires. 1928. Vol. 3. No. 5. pp. 673-712. With 16 figs. [28 refs.]

- PIGOULEWSKY (S. W.). Sur un cas d'infestation mixte par *Opisthorchis felinus* et *Dicrocoelium lanceolatum*.—*Russian Jl. Trop. Med.* 1928. Vol. 6. No. 5. p. 325. [In Russian.]
- REBELLO (Silvio), DA COSTA (S. F. Gomes) & RICO (J. Toscano). (Sur la sensibilité de l'ankylostome à l'action de diverses substances.—*C.R. Soc. Biol.* 1928. Apr. 17. Vol. 98. No. 12. pp. 993-995. With 3 text figs. [1 ref.] [Pharm. & Therap. Inst., Faculty of Med., Lisbon.]
- , — & —. Action de quelques anti-helminthiques sur les cestodes, l'ascaris et l'ankylostome.—*C.R. Soc. Biol.* 1928. Apr. 17. Vol. 98. No. 12. pp. 995-997. [Pharm. & Therap. Inst., Faculty of Med., Lisbon.]
- , — & —. Différences de réaction du ver de terre et des helminthes de l'intestin vis-à-vis de quelques anti-helminthiques.—*C.R. Soc. Biol.* 1928. Apr. 17. Vol. 98. No. 12. pp. 1021-1022. [1 ref.] [Pharm. & Therap. Inst., Faculty of Med., Lisbon.]
- RICO (J. Toscano). L'action des sulfures d'alcoyles sur l'*Ascaris lumbricoides*.—*C.R. Soc. Biol.* 1927. Aug. 26. Vol. 97. No. 25. pp. 718-719. [4 refs.] [Pharm. & Therap. Inst., Faculty of Med., Lisbon.]
- . L'action des sulfures alcalins et de quelques dérivés organiques sur l'*Ascaris lumbricoides*.—*C.R. Soc. Biol.* 1927. Aug. 26. Vol. 97. No. 25. pp. 719-720. [Pharm. & Therap. Inst., Faculty of Med., Lisbon.]
- SANKINE. Revue des travaux sur la culture des vers parasites en milieux artificiels.—*Russian Jl. Trop. Med.* 1928. Vol. 6. No. 5. pp. 333-338. [In Russian.]
- SCRIABINE (K. I.). Conférence régionales tenue à Minsk sur la lutte contre les Trichinella.—*Russian Jl. Trop. Med.* 1928. Vol. 6. No. 5. pp. 329-332. [In Russian.]
- STANKOFF (A. G.). Au sujet des invasions vermineuses parmi la population de la ville de Loubni (Ukraine).—*Russian Jl. Trop. Med.* 1928. Vol. 6. No. 5. pp. 322-324. [In Russian.]
- TSVÉTAEFF (A. A.). L'infestation vermineuse parmi la population écolière.—*Russian Jl. Trop. Med.* 1928. Vol. 6. No. 5. pp. 326-328. [8 refs.] [In Russian.]

LEPROSY.

CLARK (Taliaferro). Sur la lèpre aux Etats-Unis. [**Leprosy in the U.S.A.**].—*Bull. Office Internat. d'Hyg. Publique*. 1928. May. Vol. 20. No. 5. pp. 723-728.

The well-known incidence of leprosy in the Southern States is described, and also the foundation of the National Leprosarium at Carville in Louisiana. Here all the known lepers are now well looked after, and only discharged when they have been free from active disease and infectivity for two years. The laws regulating their transport to Carville are described.

L. Rogers.

PALACIOS DE BORAO (Gonzalo). **An Epidemiological Study of Leprosy in Porto Rico with Special Reference to Topographic and Climatic Factors.**—*Porto Rico Rev. of Public Health & Trop. Med.* 1928. July. Vol. 4. No. 1. pp. 20-45. With 6 maps. [Dept. of Health, & School of Trop. Med., Univ., Porto Rico.]

This is an interesting account of a leprosy survey in Porto Rico, where there is a single leper colony with sixty inmates, and a growing waiting list. The survey revealed 137 cases, all, with two exceptions, distributed in the coast district below 100 feet elevation; the remaining cases were found in inland towns on the main road across the Island. The cases occurred predominantly among city dwellers. The known cases give a rate of 0.1 per mille, but it is considered that there are probably two early unrecognized cases for each known one. No definite relationship to rainfall was found, but nearly all the cases developed within the temperature isotherms of 77° and 78° F., which corresponds with the low lying coastal area. Although segregated lepers often falsely deny any knowledge of leper relations, the disease was found to occur in families, examples of which are given. Conjugal cases, as usual, were very rare, on account of the first two decades of life being those of most frequent infection.

L. R.

NEFF (E. A.). [**Report on Makogai Leper Asylum, 1927.**].—*Ann. Med. Rep. Fiji, for Year ending 31st Dec., 1927.* pp. 35-38. With 1 diagram.

As is frequently the case with Colonial Medical Reports, no index or table of contents is included, necessitating turning over every page to find references to any particular disease. Patience is however rewarded by finding on page 35 an interesting report on the Makogai Leper Asylum [it should be called a leper hospital, as active treatment is used] which shows 194 admissions from the various Oceanic colonies served by the institution, including New Zealand, and 439 cases remaining at the end of the year. A satisfactory feature is that in December 36 patients were found fit for discharge on parole after being two years free from active disease and bacteriologically negative. Two children were born but were at once separated from their parents and are doing well under the charge of the Sisters. The deaths amounted to 44, 19 of which were due to exhaustion from leprosy, and the rest

to complications, especially tubercle. "Three hundred and seven patients received treatment and the results were better than usual. The best index is perhaps the enthusiasm of the patients themselves." Table C gives the results, and shows that the ethyl esters and sodium gyncardate gave the best results, and the Mercado mixture and sodium morrhuate the least improvement. The sodium gyncardate was Martindale's Fraction C. [This is now being tested in other places.]

L. R.

COOKE (F. H.). **Report on Leprosy in the Ho District, 1926-27.**—*Gold Coast Rep. Med. & San. Dept. for Year ended Apr., 1926.-Mar. 1927.* Appendix C. pp. 126-127.

The author describes starting the treatment of lepers at his hospital in the Ho district of the Gold Coast Colony, with such success that in six months 77 cases had been admitted to the hospital leper settlement. Land will shortly be acquired for a separate settlement for the colony, all of whose inmates have come voluntarily for the sake of the treatment, and two have already apparently recovered.

L. R.

- i. GIACARDY. Un cas de lèpre autochtone en France. [**A Case of Autochthonous Leprosy in France.**]—*Bull. Acad. Méd.* 1928. June 26. Year 92. 3rd Ser. Vol. 99. No. 26. pp. 717-721. With 2 text figs.
- Sur un cas de contamination lépreuse en France par lèpre importée.—*Ann. Dermat. et Syph.* 1928. Aug. 6 Ser. Vol. 9. No. 8. pp. 695-699. With 2 text figs.
- ii. SPILLMANN. A propos d'un cas de lèpre tuberculeuse observé dans le département de Meurthe-et-Moselle.—*Bull. Acad. Méd.* 1928. June 26. Year 92. 3rd Ser. Vol. 99. No. 26. pp. 721-725.
- iii. JEANSELME (E.). Des modifications qu'il conviendrait d'apporter à la loi du 17 avril 1833 pour que les lépreux, dont la période latente excède cinq ans, puissent bénéficier d'une pension de l'Etat. [**Changes in French Law to enable Lepers to draw State Pensions.**]—*Ibid.* July 17. Vol. 100. No. 29. pp. 851-854.

i. This instructive case is an interesting example of the rare occurrence of contagion in Western Europe from an imported case. The patient was a servant girl in personal attendance for one year on a lady suffering from leprosy contracted in French Guiana, her duties including massaging the patient and sleeping in her room, although in a separate bed. The first symptoms appeared seven years later, and when seen after another three years the case was a typical nodular one.

ii. This is another case of nodular leprosy found in the Meurthe-et-Moselle department of France in a Portuguese subject, who had apparently contracted the disease in Portugal, where many cases are known. He had worked in France for five years, and had suffered from the disease for two and a half years, so had entered the country while in the incubation stage. The writer advocates training medical men in the symptoms of leprosy in dermatological clinics, and the organization of centres for the isolation and treatment of lepers, and Professor JEANSELME supported his views.

iii. The author points out that under the French pension rules colonial officers' claims are only admitted for such diseases, contracted

during foreign service, as are discovered within five years of retirement. He quotes three cases in which leprosy was discovered subsequent to that period, and he advocates an alteration of the law to cover such hard cases, since the incubation period of leprosy may exceed five years.

L. R.

LEVI (Italo). Contributo allo studio della lebbra in provincia di Trieste. A proposito di un caso osservato a Trieste. [**Leprosy in Trieste.**—*Giorn. Ital. de Dermat. e Sifil.* 1928. Apr. Vol. 69. Year 63. No. 2. pp. 292-306. With 10 figs. on 3 plates. [22 refs.]]

The author has found records of 9 cases of leprosy since the commencement of the present century, eight from abroad and one from Puglia. He adds another observed by himself.

This was a man of 58 years, a native of Corfu but residing in Trieste for the last 15 years, a tanner by trade who worked barefoot. The case was a severe one of nodular and anaesthetic leprosy, affecting the face and limbs, with ulcers on the sole of each foot. He was treated in turn with chaulmoogra oil, antileprol, cuprocyan and cacodylate of sodium. He was now having intramuscular injections of an "antilepra vaccine" from the Serotherapy Institute of Vienna.

Lepra bacilli were found early in the course of treatment, but for some time past the results of examinations have been negative. The author thinks that as the first symptom was a callosity on the sole of the foot which ulcerated, this was probably the primary lesion and site of entrance of the bacilli.

Photographs and radiographs showing the condition are well reproduced. A table is given of the distribution in Italy of the 291 lepers officially recorded in 1926.

H. Harold Scott.

RIECKE (Heinz-Gerhard). Ueber einen Fall von Lepra tuberosa mit besonderer Beteiligung des Kehlkopfs und ueber die Beziehungen zwischen Leprazelle und Reticuloendothel. [**A Case of Lepra Tuberosa with Special Involvement of the Larynx and on the Relations between Lepra Cells and Reticulo-Endothelium.**—*Beiträge z. Path. Anat. u. allg. Path.* 1928. June 29. Vol. 80. No. 1. pp. 201-217. With 1 text fig. and 1 coloured plate. [18 refs.]]

A detailed post-mortem report on a case of leprosy showing lesions of the skin of the face and extremities, mucous membranes of upper air passages and of larynx, ulcers on leg, leprosy lymph glands (neck, axilla, lumbar region, abdomen, etc.), and lepromata of liver and spleen.

Death was probably due to the severe stricture of the larynx. Histological examination of all organs revealed in most cases no leprosy changes, but the organs in close connexion with the reticulo-endothelial system, viz., liver, spleen, lymph glands and spinal cord, showed leprosy changes throughout.

The author comes to the conclusion that the morphological substratum of the reciprocal changes in bacilli and cells is a lipoid metabolic disorder. The reaction of the organism is borne essentially by elements of the reticulo-endothelial system. He suggests that this may offer a way to a successful treatment.

I. R.

MAYER (T. F. G.). **Some Problems in Leprosy.**—*West African Med. Jl.* Lagos. 1928. July. Vol. 2. No. 1. p. 109.

This short paper on leprosy in Nigeria points out that further research is required on the bacteriology and pathology of the disease. The author suggests that the gorilla and the chimpanzee might be used for experimental work on leprosy in West Africa with possible advantage.

L. R.

SMITH (E. C.). **Pseudo-Leprosy.**—*West African Med. Jl.* Lagos. 1928. July. Vol. 2. No. 1. pp. 91-95. With 13 figs. on 4 plates on pp. 97-100. [Med. Research Inst., Lagos.]

At Lagos in West Africa, a skin disease simulating leprosy is not uncommon, and may possibly be a form of acne or lichen. It differs from macular leprosy in being free from acid-fast bacilli. Moreover, on injecting a few drops of a solution of pilocarpine nitrate, of the strength of $\frac{1}{4}$ of a grain in 1 cc., into the affected area and its surroundings, sweat appears on both equally, so the anhydrosis of leprosy is absent. The sensory conditions are not dealt with, although they form the best differential test.

L. R.

MARCHOUX (E.) & CARO (J.). Méthode de diagnostic sérologique de la lèpre. [**A Serological Method of Diagnosis of Leprosy.**]—*Ann. Inst. Pasteur.* 1928. May. Vol. 42. No. 5. pp. 542-552. [9 refs.]

RUBINO'S red corpuscle sedimentation reaction (this *Bulletin*, Vol. 24, p. 557) has been studied by these workers, who obtained positive results in half of ten cases by Rubino's technique, in which 1 cc. of the patient's serum is mixed with 1 cc. of sheep's red corpuscles after washing them in normal saline and adding 10 per cent. formal for 24 hours and then washing again. On keeping the mixture at 37° C., sedimentation of the red corpuscles within an hour is a positive result. The present workers found that the reaction is a specific one, and that by adding five parts of serum to one of the sheep's corpuscles instead of equal parts, the reaction was positive in all their leprosy cases within half an hour. In numerous new leper control cases the reaction was never positive. A temperature of 56° C. for an hour destroys the complement of the serum, and one of 60° C. destroys the specific substance as well.

L. R.

LABERNADIE (V.) & ANDRÉ (Z.). Recherches sur la sédimentation globulaire chez les lépreux. [**Sedimentation of Red Cells in Leprosy.**]—*Bull. Soc. Path. Exot.* 1927. Nov. 9. Vol. 20. No. 9. pp. 839-840. [4 refs.] [Leprosarium & Lab., Pondicherry, French India.]

The writers have used a modification of the method of WESTERGREEN, in which venous blood is citrated, and the sedimentation time noted at the end of an hour, and they found the process to be accelerated in leprosy as compared with other diseases, and to be greater in nodular than in nerve cases.

L. R.

MOLINELLI (Ernesto A.). La sedimentación globular en la lepra. [**Sedimentation of Erythrocytes in Leprosy.**—*Semana Méd.* 1928. Aug. 9. Vol. 35. No. 32 (1804). pp. 337-342. [10 refs.] ["José Penna" Inst. for Infect. Diseases, Buenos Aires.]; also in *Bol. Inst. Clin. Quirúrg.* Buenos Aires. 1928. Vol. 4. Nos. 28-31. pp. 425-439. [9 refs.]

This test was carried out by Westergreen's method in all the forms of leprosy, and in cases with and without complications. The results are presented in eleven tables. Sixty-seven patients in all were examined, and it was found that: (1) The sedimentation-rate was increased in 77 per cent.; least in the nervous form, fairly marked in the nodular, great in the mixed; (2) No correlation could be found between the sedimentation-rate and either the duration or the severity of the cases; (3) The rate was highest in those complicated with ulceration, nephritis, etc.; (4) The appearance of fresh symptoms, or exacerbations, was sometimes, but by no means always, accompanied by an increase in the rate; (5) The variations of rate of sedimentation do not depend on the cholesterin content of the blood; (6) The test has practically no prognostic value.

H. Harold Scott.

CRUZ (M. C.), LARA (C. B.) & PARAS (E. M.). **Blood Calcium in Leprosy.**—*Jl. Philippine Islands Med. Assoc.* 1928. May. Vol. 8. No. 5. pp. 216-221. [7 refs.]

Investigations in seventy cases in different stages of the disease showed little variation from the normal in any type, except that those with lepra fever as a rule showed slightly lower serum calcium.

L. R.

VILLELA (Gilberto G.). [In Portuguese & English.] **Calcemia da lepra. Blood Serum Calcium in Leprosy.**—*Sciencia Med.* 1928. Aug. Vol. 6. No. 8. In Portuguese, pp. 379-390. [12 refs.] In English pp. 391-395. [Oswaldo Cruz. Inst., Rio de Janeiro, Brazil.]

The serum calcium was estimated in 113 cases, including all types, and hypocalcaemia was found in every variety, the lowest figures being met with in the nerve cases, and next in the mixed form. The average figure was 8.82 mgm., and the variations from 6.0 to 10.7 mgm. against the normal of 9.0.

L. R.

OTERO (Pablo Morales) & HERNÁNDEZ (Luis G.). **Studies of the Blood Chemistry of Leprosy. Analysis of Findings in Fifty Cases.**—*Porto Rico Rev. of Public Health & Trop. Med.* 1928. June. Vol. 3. No. 12. pp. 507-515. [8 refs.]

An investigation of fifty cases led the authors to the conclusions that (1) Leprosy in itself affects very little, if at all, the concentration of the blood urea, non-protein nitrogen, uric acid, creatinine and sugar,

regardless of the type, extent, or duration of the disease. (2) Whenever definite retention is found in leprosy it is usually due to a complicating nephritis or some other concurrent condition.

L. R.

PUBLIC HEALTH BULLETIN. No. 168. Washington. pp. iii + 74.—**Studies upon Leprosy. XLIII. The Plasma Proteins in Leprosy. XLIV. Observations on the Amount of Lipase in the Blood Serum of Lepers. XLV. The Synthesis of Iododihydrochaulmoogric Acid and its Ethyl Ester. XLVI. The Preparation of 4-Chaulmoogrylamino-phenylarsonic Acid. XLVII. The Preparation of Chaulmoogryl Alcohol. XLVIII. Radium Treatment of the Nasal Lesions of Leprosy. Appendix: Protocol of Lipase Tests.**

XLIII. This study of the plasma proteins in leprosy showed that the average findings do not differ greatly from the normal, except that in a few cases of acute leprous fever the fibrin was nearly twice the normal, and the albumin-globulin ratio was low, namely about 1 as compared with 2 in normal persons, and thus resembles that of active phthisis. In recovered cases about to be paroled, the readings were nearly normal. In cases showing many bacilli, the albumin-globulin ratio was also low, and clinical improvement was generally coincident with a decrease of globulin.

XLIV. A large number of estimations of the blood lipase in various types and stages of leprosy are recorded, from which it is concluded that newly segregated lepers usually showed a normal amount of lipase in the blood serum, which did not differ materially in lepers showing improvement and those not doing so, and that the injections of chaulmoogra ester did not increase the blood lipase. On the other hand, it was decreased during some acute exacerbations of leprosy and in advanced pulmonary tuberculosis and diseases of the liver.

XLV, XLVI and XLVII deal with highly technical chemical investigations of chaulmoogra compounds. The arsenical one was too insoluble to allow of its use by injection, and the third may prove important as a starting point for the synthesis of other compounds.

XLVIII. This is a valuable report on a trial of radium in the treatment of the leprous lesions of the nasal mucous membrane. The technique adopted was the use of 50 milligrams of radium sulphate mixed with 23 milligrams of barium sulphate in a small glass tube with walls two millimetres thick, enclosed in a silver tube 23.2 by 3.7 millimetres placed in a screw-capped brass screen with a wall 1 millimetre thick. This was wrapped in a piece of rubber smeared with vaseline and pushed into the nostril, and secured by a silk thread attached to the cheek with plaster. Alternate nostrils were treated every four weeks for two hours until both had been given three exposures. The cases were nearly all under chaulmoogra ester injections, and as far as possible, similar control cases were observed, and bacteriological examinations made. It was found that the radium treatment was generally successful in removing leprous nodules from the nasal cavity, with great reduction of the lepra bacilli, although they were not completely removed. Perforations of the septum not infrequently followed the treatment, although rarely seen in the control

cases, so the authors only advise the treatment when nodules are causing some obstruction of the nose. No effect was produced on the general progress of the disease.

L. R.

KOULESCHA (G. S.). Sur la culture du bacille lépreux et sur la préparation de la léprine (Krasnodar). [**Culture of Lepa Bacillus and the Preparation of Leprine.**]—*Russian Jl. Trop. Med.* 1928. Vol. 6. No. 3. French summary p. 207. [In Russian pp. 194–206. 6 refs.]

This worker claims to have obtained multiplication of the lepra bacillus in culture media (nature not mentioned in the summary), and to have prepared a vaccine, which produced a cutaneous reaction in leprosy, and may be, he thinks, of diagnostic value.

L. R.

RÜDEL (Otto). Zur Färbung der Leprabazillen. [**The Staining of Leprosy Bacilli.**]—*Cent. f. Bakt.* I. Abt. Orig. 1928. June 20. Vol. 107. No. 6–7. pp. 357–358.

The usual TB stain is most successful with leprosy bacilli when the solutions of stains and the sulphuric acid are more or less diluted. The method is as follows:

(1) Carbol-fuchsin (fuchsin 1·0, alcohol 10·0, concentrated carbolic acid 5·0–100·0) with or without $\frac{1}{2}$ water, heat until bubbles burst. (2) Wash several times with sulphuric acid (5 per cent.) aq. water. (3) Wash with water (or in 70 per cent. alcohol). (4) Loeffler's methylene blue [concentr. alcoh. methylene blue 30·0, caustic soda solution (0·01–100·0) 100·0] aq. water, a few seconds up to 1 min. at the most. (5) Wash with water. (6) Dry and add Canada balsam (or instead of 6. rapidly wash in 70 per cent. alcohol for 2–5 seconds, absolute alcohol 1–3 seconds.—Toluol balsam).

This stain is so characteristic for leprosy that it can almost be used for differential diagnosis against TB. The leprosy bacilli react much more easily to stains and acids than TB.

L. R.

SPILLMANN (L.), KISSEL (P.) & FLORENTIN (P.). Etude histobactériologique d'un lépreux cutané. [**Histological Study of a Cutaneous Leproma.**]—*C.R. Soc. Biol.* 1928. Sept. 18. Vol. 99. No. 26. pp. 842–844.

The authors have endeavoured to trace possible connexion between early cutaneous nodules and the nerves of the skin by means of silver impregnation staining, but conclude that any such relation is fortuitous, and that the early cutaneous nodules consist of a connective tissue cell reaction of a mild type not directly related to the covering epithelial layers of the skin.

L. R.

HENDERSON (John M.). **A Contribution to the Pathology of Cutaneous Rat Leprosy.**—*Indian Jl. Med. Res.* 1928. July. Vol. 16. No. 1. pp. 1–5. With 9 figs. on 3 plates. [14 refs.]

In 90 to 100 per cent. of rats inoculated in the groin with material rich in rat leprosy bacilli the disease was produced. Suspensions of the bacilli made by grinding up rat leprosy tissues, and centrifuging off

the sediment quickly, were standardized by comparing their opacity with standard tubes to regulate the dose. The rats were killed at different intervals and microscopical studies made, and it was found that from an early stage the bacilli are mainly intracellular in plump lepra cells of the corium, and both increase from the second to the eleventh week, and then the lesions spread and cause ulceration after the twentieth week. By also using intra vitam staining by intravenous and intraperitoneal injections during life of trypan-blue, he came to the conclusion that the lepra cell can thus be stained, and that it is simply a modified histiocyte.

L. R.

HENDERSON (John M.). **The Presence and Significance of Large Multinucleated Cells in Leprosy.**—*Indian Jl. Med. Res.* 1928. July. Vol. 16. No. 1. pp. 7-10. With 5 figs. on 2 plates. [10 refs.]

Microscopical sections of the early skin lesions of both macular and nerve leprosy showed multinucleated large lepra cells containing a few lepra bacilli, more frequently than hitherto suspected, and he suggests that they are derived from a fusion of lepra cells, and that this is an attempted defensive mechanism against destruction by the bacilli.

L. R.

MUIR (E.). **The Iodide-Sedimentation Test in Leprosy.**—*Indian Jl. Med. Res.* 1928. July. Vol. 16. No. 1. pp. 135-139. With 1 text fig. [6 refs.]

The effect of iodides internally on the rapidity of the sedimentation of the red corpuscles in citrated blood has been investigated by the following simple and rapid technique:—1.2 cc. of vein blood is drawn up into a syringe containing 0.3 cc. of 5 per cent. sodium citrate solution, and the mixture ejected into a test tube. 1 cc. is then drawn up into a 1 cc. pipette graduated in 1-100ths, and the point stuck into a rubber disc in a rack. The point to which the corpuscles have sedimented is read off after two or three hours and the mean taken. In active fairly advanced nodular cases classed as B1 and B2, the index is high, such as 40 to 60, against 10 to 20 for normal bloods, and it rises by 10 to 30 points after a dose of iodide, which produces a reaction. When iodides, even in 240 grain doses, no longer produce a reaction, the index falls to 10 to 20, although the injection of hydnocarpus oil in doses of 6 to 7 cc. may produce a fall, and this reaction may be used to determine if the case is cured or not. An increase in the sedimentation time under iodides may be a sign of infection in doubtful cases or in leper contacts, and the test may also be used to determine if any drug produces reactions in leprosy, with possible benefit.

L. R.

MARGAROT (J.) & DEVEZE (P.). Le diagnostic sérologique de la syphilis chez les lépreux. [**Serological Diagnosis of Syphilis in Leprosy.**]—*Ann. Dermat. et Syph.* 1928. July. 6 Ser. Vol. 9. No. 7. pp. 576-580. [1 ref.]

Tests with a number of antigens showed that when all of them gave positive reactions in lepers it indicated concomitant syphilis, but if leprosy only was present, then some antigens gave positive reactions and some negative ones.

L. R.

EHARA (Ichiro). Die Veränderung des mit Leprablut geimpften Kaninchenhodens. [**The Changes in Rabbit's Testicle inoculated with Leprous Blood.**]—*Okayama-Igakkai-Zasshi* (Zent. d. Okayama Med. Gesellsch). 1928. May. Vol. 40. No. 5 (460). German summary p. 1037. With 4 figs. on 1 plate. [In Japanese pp. 1025-1036.] [Univ. Skin Clinic, Okayama.]

When 1 cc. of leprous blood is injected into the testicle of a rabbit, there appears for a few days a reddish swelling, receding after 4-5 days. The testicle then atrophies gradually until after 10-15 days it is only the third of its normal size.

Histologically the testicle first shows degeneration or necrosis of the sperin-cells, but after 5-6 days their protoplasm becomes light almost everywhere—probably owing to fatty infiltration—and finally the interstitial tissues proliferate with lymphocytic infiltration. In the seminal tubules one often sees numerous giant-cells which perhaps arise from the confluence of spermatocytes and spermatides.

As control experiments the author inoculated the blood of patients suffering from various kinds of herpes, encephalitis lethargica, furuncle, phthisis, lues papulosa, malaria, cancer of the bladder, and also rabies vaccine into the testicle of rabbits. In these experiments, necrosis or degeneration did often occur in the parenchyma, but no such serious atrophy as is found in the leprosy experiment.

L. R.

NICOLAS (C.) & ROXAS-PINEDA (E.). **Results of Anti-Leprosy Treatment in Children at the Culion Leper Colony.**—*Jl. Philippine Islands Med. Assoc.* 1928. July. Vol. 8. No. 7. pp. 314-317.

This paper deals with the important subject of the treatment of the comparatively early cases of leprosy seen in the children born in the Culion Leper Colony, and only include cases of confirmed leprosy, clinically or bacteriologically positive, and not suspected cases. They numbered seventy, nearly equally divided between boys and girls, aged from 1 year 8 months to 15 years, and in the bacteriologically positive cases with a duration of a few months to five years. Chaulmoogra ethyl esters, and other allied preparations, were used by injection over periods of from ten months to five years six months, and in the majority for over two years. The results have been very satisfactory, for 50 per cent. of 36 males and 58.8 per cent. of 34 females are now negative. Of 36 early cutaneous cases, 66.8 per cent. are negative, and of a total of 40 early cases, 27 or 67.5 per cent. are negative, but only one of three advanced cases had cleared up after more than four years' treatment. They conclude that in early, or slightly advanced, cases this treatment is attended by a large percentage of apparent cures.

L. R.

LARA (C. B.), DE VERA (B.) & EUBANAS (F.). **Results of Trials by Sodium Hydnocarpate and Bruschettini Vaccine in Leprosy.**—*Jl. Philippine Islands Med. Assoc.* 1928. June. Vol. 8. No. 6. pp. 261-263. [Med. Section, Culion Leper Colony.]

Pure sodium hydnocarpate intravenously was tried in seven cases, but two were dropped owing to vein difficulty; the rest were moderately advanced mixed cases with predominating cutaneous lesions.

A 1 per cent. solution in doses of from .1 to 30 cc. and from 21 to 46 injections in six months showed neither improvement nor retrogression. Only one had any reaction and four put on weight. Bruschetti vaccine of unknown composition also gave only negative results.

L. R.

LARA (C. B.). **Evaluation of the Results of Treatment of Leprosy with the Chaulmoogra Derivatives.**—*Jl. Philippine Islands Med. Assoc.* 1928. June. Vol. 8. No. 6. pp. 263-272. [17 refs.]

One of the results of the improved treatment of leprosy is that whereas "six years ago most of the lepers had to be captured or forcibly detained, during the last three years the great majority have presented themselves voluntarily for isolation and treatment....A more general appreciation of the value of the chaulmoogra preparations will have a tremendous and far reaching importance in the eradication of the disease." The further results at the Culion Colony show that from 1906 to 1921 (fifteen years) only 47 cases were parolled as negative, but from 1922 to September 30 1927 (5 years and 9 months) 589 had been parolled or discharged as negative. Further, 39 had died in the colony after becoming negative, and 257 more are awaiting six months as negative before discharge, or a total of 885 negatives since 1922, or approximately 16 per cent. of the total cases treated, in spite of the great majority being in an advanced stage of the disease on admission. Ethyl esters made from *Hydnocarpus wightiana* oil has been the main treatment. During the last two years the plan of injecting small doses beneath the cutaneous lesions, in addition to larger doses intramuscularly, has been used with more rapid benefit than by the latter method alone. Young robust persons do best, and married life in adolescents is unfavourable to the treatment; females do better than males, and nerve cases better than other types. Most of the negative cases required three years to clear up. The author considers that febrile reactions are injurious, and the best results are got in their absence, for 90 per cent. had no appreciable reaction. Clinical relapses are uncommon, probably not more than 5 per cent. after being negative two years.

L. R.

ROXAS-PINEDA (Elisa), NICOLAS (Catalino) & LARA (C. B.). **The Carbon Dioxide Combining Capacity of the Plasma in Lepa Reaction, and the Effects of the Administration of Sodium Bicarbonate and other Drugs.**—*Jl. Philippine Islands Med. Assoc.* 1928. May. Vol. 8. No. 5. pp. 207-216. [5 refs.]

This investigation was undertaken owing to a suspicion of the occurrence of hypoalkalinity of the blood during lepra reactions, and Van Slyke's method was used for the determination of the carbon dioxide combining power of the blood plasma. Observations were made in 44 lepra reactions and in 18 uncomplicated cases, and in 27 of the reaction cases a slight diminution was found, which disappeared as the temperature fell to normal, but in no case were symptoms of acidosis noted. In three cases with nephritis renal function was impaired. The administration of sodium bicarbonate and of calcium chloride

was beneficial during the reaction, especially if combined, but antipyrine was of no value. Ammonium chloride increases acidosis and aggravates the reactions.

L. R.

CRUZ (M. C.). **Ultraviolet Rays as Adjuvant in the Treatment of Leprosy.**—*Jl. Philippine Islands Med. Assoc.* 1928. July. Vol. 8. No. 7. pp. 312-314. [2 refs.]

This method has been used, in addition to chaulmoogra ester injections, in 34 cases for sufficiently long to be reported on, by means of compression with quartz applicators for one or two minutes up to an hour, with intervals of six to ten days as a rule. The total exposures varied from 15 minutes to 13 hours during a total period of eleven months. The result as regards the infiltrations and nodules was practically nil and numerous bacilli remained in the lesions, but in three cases of ulceration great improvement resulted. Lepra reactions were not induced, and the local reaction consisted in erythema, pain and blister formation, but no ulceration was produced, and pigmentation resulted. The rays do not appear to penetrate sufficiently to be of any value in treatment.

L. R.

ARAÚJO (C. de Souza). [Tratamento moderno da lepra.] **Modern Treatment of Leprosy.**—*Oitava Conferencia sanitaria Pan Americana.* Lima, Peru. 1927. Oct. Broch. 28 pp. 1928. Rio de Janeiro. Impr. Inst. Osw. Cruz. [Summarized in *Bull. Inst. Pasteur.* 1928. Aug. 15. Vol. 26. No. 15. pp. 709-710.]

This brief abstract states that excellent results are obtained in Muir's A1, A2 and B1 cases with chaulmoogra esters, but not in more advanced nodular cases. The Mercado-Heiser formula during the three years 1921-24 in Para in 900 cases gave 43 per cent. of cures, 35 per cent. greatly improved, 15 per cent. stationary and 5 per cent. worse.

L. R.

PALDROCK (A.). Die CO₂-Schnee- und Solganalbehandlung der Lepra. 2. Mitteilung. **[The CO₂-Snow and Solganal Treatment of Leprosy. 2nd Communication.]**—*Arch. f. Schiffs- u. Trop.-Hyg.* 1928. July. Vol. 32. No. 7. pp. 335-347. With 2 text figs.

The first course of treatment was described in an earlier article [*Ante*, p. 207.] After a six-months' interval for recuperation, during which no treatment was given, the treatment was resumed upon six of the patients. In the interval all six had increased in weight and showed a more rapid sedimentation of erythrocytes; in two cases the leprosy germs were still absent from the nasal mucus, in one they had disappeared, in two they were still present and in one they had made their appearance again. All the patients looked well. Leprosy bacilli taken from diseased parts of the skin after the first course of treatment were almost exclusively gram-negative granular forms. After the 6 months' interval there were also gram-negative rods and, in addition, gram-positive examples of both forms. Paldrock concludes that the

loss of acid-fastness is a sign of the weakening of the microbe, but that the change of form may be considered as an attempt to adjust itself to a saprophytic existence. He repeats his assumption that according to its structure and mode of development the leprosy germ belongs to the group of Actinomycetes or Streptothrix-like microbes, and that the bacillary form is only one of its developmental stages.

The second course of treatment was the same as the first one previously described. The good results already obtained in three cases and the moderate results in one case were maintained, while in two cases they were less satisfactory than in the first treatment. They confirm the results of the first treatment and justify the following conclusions: 3-4 seconds' freezing of lepromata with CO_2 -snow at -78° effects such a colloidal change of all their constituents that activated defensive powers are now able to decompose them. The decomposed products are carried all over the body, and as antigens cause a formation of antibodies and a disappearance of leprosy symptoms even from parts of the body not frozen with CO_2 -snow. First the bacillary forms of the leprosy germs and then the granules, deprived of their protective envelope, are broken up. At each of the sittings, which are repeated every 3-4 weeks, 10 lepromata are frozen, and when such treatment has lasted for 4 months an equally long period of rest, during which no treatment is given, must ensue. But if after two years' CO_2 snow treatment the system becomes accustomed to the same stimulus a different one must be substituted. Previous experiences have shown solganal to be suitable for this purpose, because fresh protective forces are liberated for the fight against the already weakened leprosy bacilli, and the organisms themselves are chemically attacked by solganal. The continued breaking-up can be followed by the gradual decrease in size of the granules until they finally disappear. In the treatment of leprosy both remedies must be used, the CO_2 -snow as an immunizing agent and the solganal as a specific chemotherapeutic drug.

L. R.

FELDT (Adolf). Die Goldbehandlung der Tuberkulose und der Lepra. Klinische Erfahrungen mit Krysolgan. [**The Gold Treatment of Tuberculosis and Leprosy. Clinical Experiences with Krysolgan.**]—44 pp. [73 refs.] 1923. Carl Marhold Verlagsbuchhandlung Halle a. S.

This is a survey of the literature on krysolgan in the treatment of tuberculosis, and no new work is reported. The survey is followed by summaries of all the articles noted. Only one case of leprosy is mentioned, that of SCHNAUDIGEL, who reports on a case of old maculo-anaesthetic leprosy which was very favourably influenced by injections of krysolgan.

L. R.

MANSON-BAHR (Philip). **On Two Apparent Recoveries from Anaesthetic Leprosy following Protein Shock Treatment.**—*Lancet*. 1928. June 2. pp. 1111-1112. With 2 text figs. [3 refs.]

A study of the literature on the therapeutics of leprosy suggests that those reagents which cause the most profound constitutional disturbance produce the best results.

Two early cases of anaesthetic leprosy in students from the East, in whom the manifestations of the disease first appeared in England, are here described.

The first was treated with Hasson's vaccine, of which six intravenous injections were administered in 1925. The anaesthetic patch (from which leprosy bacilli were recovered) gradually resolved and the improvement has been maintained so that three years after the treatment all signs have disappeared. Realizing that the constitutional disturbance produced by the injection was probably due to non-specific "protein shock," the second case of anaesthetic leprosy of the fore-arm (of which illustrations are given both before and after treatment) was treated with intravenous injections of typhoid-paratyphoid vaccine in weekly doses ranging from 50-200 million organisms. The results were eminently satisfactory, not only did the macular rash disappear from the elbow, but growth of hair on the affected part and restoration of sensibility took place. The effect has remained permanent for two years.

It is possible that beneficial results such as these may not be obtained in every case of anaesthetic leprosy, but in early cases protein shock should be given a trial.

P. H. Manson-Bahr.

- i. REMLINGER (P.) & BAILLY (J.). Essai de traitement de la lèpre par le B.C.G. Innocuité absolue de doses très élevées du bacilli. [**Treatment of Leprosy by B.C.G. and by Methylic Antigen.**].—*Bull. Soc. Path. Exot.* 1928. Apr. 18. Vol. 21. No. 4. pp. 283-287. [4 refs.]
- ii. SOUCHARD (L.). Note sur le traitement des lépreux par le B.C.G. à l'hôpital de Choquan.—*Arch. Insts. Pasteur d'Indochine.* 1926. Apr.-Oct. Nos. 3 & 4. pp. 51-54.
- iii. GIRARD (G.) & DUCROS. Essai de traitement de la lèpre par l'antigène tuberculeux méthylique.—*Bull. Soc. Path. Exot.* 1928. July 11. Vol. 21. No. 7. pp. 594-595. [1 ref.] [*Pasteur Inst., Tananarive, & Manankavaly Leprosarium.*]

i. Improvement reported in leprosy after injections of B.C.G. has not proved lasting. In the case now reported enormous doses were given without harm except the production of a cold abscess, namely 2 grams of the tubercle bacilli in six months. A considerable amelioration of the symptoms was observed for a time, but it was not maintained.

ii. Eleven cases with cutaneous lesions suitable for observing the effects of treatment have been given injections of B.C.G. subcutaneously, but the author was unable to confirm the favourable results previously reported by PONS and CASTEL, for no lasting curative action was found.

iii. The methylic tuberculous antigen of NÈGRE has been tried in the treatment of leprosy with negative results in six typical cases of different types, although in five of them no less than 67 one cc. injections were given subcutaneously in the course of four months.

L. R.

ARAÚJO (H. C. de Souza). Tratamento externo da lepra. [**External Treatment of Leprosy.**]—*Sciencia Med.* 1928. May. Vol. 6. No. 5. pp. 209–213.

A compilation of brief notes from various accounts by those who have used external remedies in leprosy.

H. Harold Scott

VAN WAVEREN (W. F. J.). Uitkomsten van een oor-, neus- en keelonderzoek bij lepralijders in Ned.-Indië. [**Results of Ear, Nose and Throat Examination of Lepers in the Dutch East Indies.**]—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1928. Vol. 68. No. 2. pp. 208–234. [20 refs.]

The author examined 214 lepers in two asylums, one near Sourabaya, the other on Amboina. The results are presented in tabular form. From the text, which contains a review of the literature on this subject, the following is a selection:

Ear. Apart from the alterations of the skin of the external ear, no affection was found typical of leprosy. The frequency of chronic inflammation of the middle ear is not greater in lepers than in persons not suffering from this disease. No functional tests were made.

Nose. Nasal affections are very common and may play a part in the infectivity of the disease. Yet the author found nothing which could support the theory which considers the nose as the site of the primary infection. In patients in whom no nasal affection could be detected in 9 per cent. the lepra bacillus was found in the nasal mucus. Of patients with slight nasal symptoms (thick slime, peculiar pallor or redness of the mucous membrane) also 9 per cent. were found to harbour the bacillus. The same was present in 45 per cent. of patients with erosions, in 65 per cent. of patients with ulcers, in 80 per cent. of those with granular affection of the nose and in 50 per cent. of cases with perforation of the septum. The differential diagnosis has to be made from syphilis, rhinopharyngitis mutilans, tuberculosis, rhinoscleroma, abscess and simple perforating ulcer of the septum and ozaena.

Throat. Hoarseness is very common in lepers and is caused by laryngeal affections, mostly chronic laryngitis, the specific character of which, however, is not probable. Actual leprosy of the throat is most pronounced in patients showing extensive affection of the nose and is considered by the author as secondary to the latter.

W. J. Bais.

MARRAS (Antonio). La reazione meiotagminica stalagmometrica e precipitante nella lepra. [**The Stalagmometric and Precipitant Forms of the Meiotagmin Reaction in Leprosy.**]—*Biochem. e Terap. Sperim.* 1928. July 31. Vol. 15. No. 7. pp. 264–277. [45 refs.] [*Dermo-Syph. Clinic, Univ., Cagliari.*]

The meiotagmin reaction of ASCOLI tended to fall out of use, partly because of the need of a Traube's stalagmometer and partly because of the delicate adjustments for variation in drops with variations in temperature. The replacement of true leprotic antigen by a synthetic one—ricinolic acid—was found to act well. To 0.2 cc. of the serum is added 1 cc. of antigen emulsion obtained by diluting the acid (1 pt.) with pure methyl alcohol (9 pts.) acetone-free; the results are read after 24–36 hours at 37° C.

The author carried out the tests with leprotic antigen and with the synthetic, by the stalagmometric and precipitant methods in parallel, with 33 cases of leprosy of which 5 were nodular, 11 anaesthetic, 14 mixed, and 3 incipient (children of lepers showing no clinical signs of disease). The results may be most easily presented in tabular form compiled [by the reviewer] from statements spread through the text.

Form of disease.	M.R., leprotic antigen.			M.R., synthetic antigen.			M.R.P., with synthetic antigen.		
	pos.	neg.	?	pos.	neg.	?	pos.	neg.	?
Nodular (5) ...	5	0	0	5	0	0	5	0	0
Anaesthetic (11)	7	1	3	7	3	1	6	3	2
Mixed (14)	9	4	1	9	1	4	14	0	0
Incipient ...	1	1	1	2	1	0	2	1	0

From this it appears that the tests are of equal value in nodular cases, the precipitant with synthetic antigen better in mixed forms. The numbers, however, are too small for drawing conclusions.

H. Harold Scott.

CAMPLANI (Mario). Singolare reazione cutanea in lebbroso trattato con raggi X.
— *Riforma Med.* 1928. Mar. 19. Vol. 44. No. 12. pp. 314-316; 319.
With 1 text fig. [9 refs] ["Maggiore" Hosp., Bergamo.]

TROPICAL OPHTHALMOLOGY :

A REVIEW OF RECENT ARTICLES.—X.*

CONJUNCTIVA.—*Tularaemia of the Conjunctiva.*—CLARK¹ has reported a case of atypical conjunctivitis tularensis in a boy aged 7. Moderate oedema of the lids, marked chemosis of the temporal portion of the bulbar conjunctiva, and an oval, punched out conjunctival ulcer, situated 4 mm. from the temporal margin of the limbus were noted. The ulcer was 3 mm. deep and from 4 to 5 mm. in diameter. It had raised, indurated edges and a gray necrotic centre. The cornea and uvea were unaffected. The preauricular gland was large, hard, and swollen. Pulse 120 and temperature 102.4 F. Symptoms began to subside on the sixth day and the ulcer had healed and all swelling had disappeared by the twenty-fourth day. At the end of the first week the serum showed a strong positive reaction to *Bact. tularensis* in a dilution of 1-160. No animal source of infection could be traced.

Conjunctival Bilharziasis.—SOBHY² has recorded a case of bilharziasis of the conjunctiva in a child aged 8. The appearance suggested an abscess of the upper lid. A mass of inflammatory tissue was removed with the infiltrated tarsus. Shortly after operation the upper portion of the bulbar conjunctiva was reported to be highly injected and swollen and to show several yellowish points which resembled miliary tubercle. Simple local treatment was applied and nine intravenous injections of tartar emetic were administered. Very numerous ova of *Schistosoma haematobium*, furnished with terminal spines, were found in sections of the removed tissue. The ova were surrounded by a zone of endothelial cells and fibroblasts; many giant cells and lymphocytic nodules were observed.

Rhinosporidium kinealyi of the Conjunctiva.—DUGGAN³ reports a case of rhinosporidial polypus of the conjunctiva. The growth sprang from the semilunar fold and the adjacent bulbar conjunctiva. It was papillomatous in character and its free end, which protruded through the palpebral fissure, was covered by a scab. The patient was a Mahommedan male aged 52 years. Pathological examination showed the nature of the case. [Possibly this condition is sometimes overlooked; but ordinarily its appearance is very typical. The growth is usually flattened by pressure between the lid and the globe, and shows branching ribs of fibrous tissue which resemble the markings on a leaf. On a bright red ground of granulation tissue, of which the main mass of the tumour is composed, yellowish, semitranslucent dots can be seen.]

Trachoma.—In a posthumous paper NOGUCHI⁴ has reported the successful inoculation of experimental chronic granular conjunctivitis

* For the ninth of this series see Vol. 25, pp. 475-485.

- 1 CLARK (C. P.). Atypical Conjunctivitis Tularensis: with Case Report.—*Amer. Jl. Ophthalm.* 1928. Apr. Ser. 3. Vol. 11. No. 4. pp. 280-284. With 1 text fig. [24 refs.]
- 2 SOBHY (M.). Bilharziasis of the Conjunctiva.—*Jl. Egyptian Med. Assoc.* 1928. Jan. Vol. 11. No. 1. pp. 12-15. With 2 text figs. & 2 coloured plates.
- 3 DUGGAN (J. N.). A Case of Rhinosporidium kinealyi.—*Brit. Jl. Ophthalm.* 1928. Oct. Vol. 12. No. 10. pp. 526-530. With 4 figs. on 2 plates. [6 refs.]
- 4 NOGUCHI (Hideyo). The Etiology of Trachoma.—*Jl. Experim. Med.* Supplement No. 2. 1928. Aug. 1. Vol. 48. No. 2. 53 pp. With 31 plates (5 coloured). [47 refs.] [Rockefeller Inst. for Med. Research, New York.]

after several passages of the *Bacterium granulosis* (referred to in this *Bulletin*, Vol. 24, p. 1013 & *ante*, p. 476) through monkeys. A rhesus was successfully infected by a pure culture of the bacterium and infected material was passed from rhesus to rhesus, rhesus to chimpanzee, chimpanzee to chimpanzee, and chimpanzee to rhesus. The bacillus was recovered as early as 37 days and as late as 204 days after culture inoculation, as well as in animals of the first and second tissue passages. Isolation of the bacillus is difficult owing to the frequent presence of other organisms. It is claimed that, in the absence of indications to the contrary, the bacterium granulosis may be considered to be the exciting micro-organism of trachoma in man and its equivalent, granular conjunctivitis, in monkeys.

TRAPESONTZEWA⁵ from her experience amongst Russian peasants, expresses the decided opinion that trachoma is not contagious in its late cicatricial form. Schools and military service play an important part in spreading infection; children, too, may become infected by trachomatous nurses. She thinks that there may be "trachoma carriers" just as there are known to be "carriers" of bacillary diseases such as typhoid. Cases of swimming-bath conjunctivitis may easily be mistaken for an acute form of trachoma.

KANDA & TAKIZAWA⁶ investigating the question of trachoma in Formosa found that in Takao, a city of about 48,000 inhabitants, 24 per cent. of Japanese school children and 68 per cent. of Formosan children were infected. The Japanese children live under better sanitary conditions, especially as regards over-crowding, than the Formosan. The authors believe that the water supply is of paramount importance as a factor in infection; the Formosans suffer since they prefer to obtain their supply from shallow, insanitary wells rather than from the City supply.

HARSTON⁷ reports that he has treated about 50 cases of trachoma by exposure to ultra-violet rays and has effected a complete cure in every case, even though pannus seriously involved the cornea. After instilling cocaine the patient is seated in front of a tungsten arc lamp, his eyes being on a level with the arc and 2½ to 3 ft. distant from it. The lids are closed gently so as to avoid any wrinkling of their skin. A nickelled copper mirror is employed to focus the light on to the closed lids. Each eye is irradiated through the closed lids for a period of from two to four minutes. Sitzings are repeated twice weekly with an interval of from three to four days between each. RECHNITZER⁸ speaks highly of brisk friction applied to the diseased membrane. He employs cotton-wool wrapped round a glass rod and forcibly rubs the conjunctiva, paying special attention to the transitional folds, until

⁵ TRAPESONTZEWA (C.). Certains caractères épidémiologiques du trachome.—*Rev. Internat. du Trachome*. 1928. Apr. Vol. 5. No. 2. pp. 49-66.

⁶ KANDA (K.) & TAKIZAWA (T.). Some Epidemiological Factors of Trachoma Infection, especially the Water Supplies, among the Inhabitants of the City of Takao.—*Taiwan Igakkai Zasshi* (*Jl. Med. Assoc. Formosa*). 1928. Apr. No. 277. English summary pp. 27-30. [13 refs.] [Takao Hosp. & Municipal Board of Health, Takao.]

⁷ HARSTON (G. M.). The Light Treatment of Trachoma. A Painless Method for the Rapid Cure of Trachoma by Ultra-Violet Radiation and Some Notes on the Extreme Value of Ultra-Violet Radiology in Ophthalmology.—*China Med. Jl.* 1928. July. Vol. 42. No. 7. pp. 497-500.

⁸ RECHNITZER (Slavo). Ueber die Wirkung mechanischer Eingriffe bei Trachom.—*Med. Klin.* 1927. Nov. 4. Vol. 23. No. 44 (1195) pp. 1692-1693.

it bleeds freely. He states that no great pain is experienced and that most of his patients feel an immediate relief. In some cases a single treatment sufficed to cure the disease. Trachomatous ulcers of the cornea, too, responded well. The author very fully discusses why the treatment should prove so beneficial and concludes that the relief to the vascular and lymphatic circulation, caused by the free depletion and the removal of diseased tissue, is the chief factor. The relief afforded to the blood-supply of the transitional fold induces a freer flow through the limbic vessels and thus improves the nutrition of the cornea. DELANOË⁹ has described the technique employed in treatment by chaulmoogra oil. This consists in a thorough grattage of the fully everted lids using a sterilized mop which is saturated with the oil. The treatment may be repeated daily and is claimed to be painless and rapidly beneficial. FOÀ¹⁰ with an experience obtained from 40 patients whose ages ranged from 7 to 60 years, and who suffered from various types of the disease, also reports favourably on this form of treatment. He rubs the cocaineized conjunctiva with a pledget of gauze soaked in the oil. The oil has a melting point of 20–21°C. and a specific gravity of 0.9535 at 25°C. and is kept liquid in a water-bath. The average course of treatment lasts from eight to twelve weeks. A paper on the therapy of trachoma by FUCHS¹¹ contains nothing novel and mostly deals with the ordinary and well known methods of treatment. Many such are described, but the author does not state his own experience of them. It is argued that since the trachoma follicles are situated in the deeper layers of the conjunctiva they are unlikely to be affected by surface applications. [Yet, if trachoma follicles represent the reaction of the tissue to a surface irritation, removal or diminution of such irritation should prove beneficial.] The difficulty in the diagnosis of true trachoma is mentioned.

CORNEA.—*Keratomalacia*.—VISWALINGAM¹² has fairly frequently observed keratomalacia amongst Indian labourers in Malay. As elsewhere it most often attacks badly nourished children under five years old. He thinks that neglect of the oil bath may be a factor in the incidence of the disease as the gingelly oil which is used for the bath and for cooking has a high nutritive value and contains valuable vitamins. Artificial feeding of infants and poor economic circumstances also play an important part. He recognizes the importance of treatment on general constitutional lines with the administration of foods having a high vitamin content. [The disease is common amongst children in Southern India, and careful dosing with codliver oil is the mainstay in prophylaxis and cure. If the condition of the child precludes oral administration of the oil it should be used as an inunction or should be given to the nursing mother of a breast-fed infant. Chlorides, especially that of calcium, are also helpful. It is necessary to avoid any local remedy which is in the least irritating; even atropine may prove harmful.]

⁹ DELANOË. Technique de l'application de l'huile de chaulmoogra dans le trachome.—*Presse Méd.* 1928. June 30. Vol. 36. No. 52. p. 828.

¹⁰ FOÀ (Raffaele). Sui risultato della terapia del tracoma con l' "olio di chaulmoogra."—*Ann. di Med. Nav. e Colon.* 1928. May–June. Year 34. Vol. 1. No. 5–6. pp. 289–306. [16 refs.] [Eye Clinic, Univ., Turin.]

¹¹ FUCHS (Ernst). Die Therapie des Trachoms.—*Wien. Med. Woch.* 1927. Nov. 26. Vol. 77. No. 48. pp. 1615–1618.

¹² VISWALINGAM (A.). Keratomalacia.—*Malayan Med. Jl.* 1928. June. Vol. 3. No. 2. pp. 84–86. With 4 figs. on 1 plate.

UVEA.—*Iritis due to Relapsing Fever.*—SACHS¹³ reports two cases of iritis which followed the inoculation of patients suffering from cerebrospinal syphilis with *Spironema obermeieri*. The first was a man aged forty who had been infected ten years previously and whose nervous symptoms had been present for four years. A mild iridocyclitis attacked one eye four weeks after inoculation. This subsided in three weeks and all signs of inflammation had disappeared in eleven weeks. The second was a man aged forty-nine. Syphilitic infection had occurred twenty years before and cerebrospinal symptoms had existed for one and a half years. Iritis set in five weeks after the last attack of inoculation fever. It was of an acute syphilitic type and responded promptly to anti-syphilitic treatment. SACHS considers that the relapsing fever was the cause of the ocular symptoms in both cases, though he admits there may be some doubt regarding the second. He remarks that *Sp. obermeieri* has been more frequently found to be the cause of iritis in relapsing fever than has *Sp. duttoni*.

MASON¹⁴ recommends the use of "streptococcus immunogen combined" (a Parke Davis preparation) as a substitute for milk injection in the treatment of iritis and iridocyclitis by "protein shock." He states the injection causes no unpleasant symptoms or febrile reaction and may be expected to effect an improvement within twenty-four hours. He injects 1 cc. intramuscularly and increases the dose every day to a maximum of 2 cc.

LENS.—*Cataract.*—The beneficial value of a "conjunctival bridge" is now well known to many surgeons but EWING¹⁵ found that a number of his colleagues were unfamiliar with this form of flap. He has found it helpful to deliver the lens by employing counter-pressure by a spatula placed beneath the bridge. PATON¹⁶ overcomes the difficulty connected with the performance of an iridectomy beneath the flap by fashioning a narrow bridge and placing it well to the temporal side. ELSCHNIG¹⁷ prefers suture of the flap to extraction beneath a conjunctival bridge as he finds it easier to deliver the lens and to deal with the iris in the former case. He applies 5 per cent. tincture of iodine to the suture and to the entire wound after completing extraction so as to avoid any increased risk of infection. He uses a retro-bulbar injection of 1 cc. of 2 per cent. novocaine with adrenalin, and he cuts a conjunctival flap 3 mm. wide as he completes his section. He then passes a stitch through the flap and through a corresponding point of the wound in the bulbar conjunctiva. The portion of the suture lying between the lips of the wound is pulled to one side in a loop where it rests out of the way. The ends of the thread are tied in a half hitch which can be quickly tightened when necessary. ROY¹⁸ has described

¹³ SACHS (Ilse). Recurrens-Iritis.—*Med. Klin.* 1927. Apr. 29. Vol. 23. No. 17 (1168). pp. 640-641. [1 ref.]

¹⁴ MASON (R. E.). Bacterial Antigen in Uveitis.—*Amer. Jl. Ophthalm.* 1928. Sept. Ser. 3. Vol. 11. No. 9. pp. 702-705. [2 refs.]

¹⁵ EWING (A. E.). A "Conjunctival Bridge" in Cataract Extraction.—*Amer. Jl. Ophthalm.* 1928. Mar. Ser. 3. Vol. 11. No. 3. pp. 219-220. With 3 text figs.

¹⁶ PATON (Leslie). Conjunctival Bridge in Cataract Extraction.—*Brit. Jl. Ophthalm.* 1928. Oct. Vol. 12. No. 10. p. 525.

¹⁷ ELSCHNIG (A.). The Corneal Suture in Senile Cataract Extraction.—*Amer. Jl. Ophthalm.* 1928. Apr. Ser. 3. Vol. 11. No. 4. pp. 267-270. With 4 text figs. [8 refs.]

¹⁸ ROY (Mano Mohun). A Cataract Expression Operation.—*Indian Med. Gaz.* 1928. June. Vol. 63. No. 6. pp. 323-324.

his method of performing SMITH's operation. The main modification appears to be that he performs an iridectomy with his knife whilst making the section.

Glaucoma.—MUKERJEE¹⁹ has observed two cases of unilateral glaucoma in patients suffering from large naevi on the same side of the face as the affected eye. One of these was a boy aged 11, and the other a man aged 25. Both responded well to trephining.

SEDAN²⁰ has found that Lagrange's operation sometimes failed to give permanent satisfactory results when performed upon the trachomatous patients he so often encounters at Marseilles. The fistulous opening was liable to close and the ocular tension to rise again. He attributes this to a poor lymph circulation in the altered bulbar conjunctiva. In consequence he has modified the technique employed by LAGRANGE, and, instead of raising the flap with Graefe's knife cutting from below, he fashions a large flap similar to that used in ELLIOT's operation. Care is taken to dissect the flap right down to the limbus; and a Graefe's knife is used to aid the dissection. He excises a larger piece of sclera in these cases also.

HAMBURGER²¹ has for some years past advocated the medicinal treatment of glaucoma by the use of glaucosan. PISCHEL²² found that in cases of glaucoma simplex treated by him laevo-glaucosan always reduced the ocular tension. In some cases meiotics which had become of no avail regained their former beneficial effect after a course of the drug. Laevo-glaucosan is used in a 2 per cent. solution. Holocaine 1 or 2 per cent. solution is first instilled as the treatment may prove a little painful. Very careful attention should be paid to the instillation of the glaucosan in order to induce the maximum degree of absorption. After all irritation from the holocaine has subsided and the conjunctival sac has become free from tears two drops of laevo-glaucosan are instilled. The patient should be supine and the surgeon should hold the lids apart for a minute whilst the eye is rotated in various directions so as to expose as much as possible of its surface to the action of the drug. The instillation can be repeated every fifteen minutes up to five instillations. In the course of a few minutes the eye becomes blanched and the pupil dilates. Aminoglaucosan is recommended for the treatment of acute glaucoma and is used in a similar fashion except that only one instillation is made. It produces a marked vascular reaction and is a very powerful meiotic.

For *intraorbital anaesthesia* during enucleation AYUYAO²² recommends a "solution of 2 per cent. novocaine with some magnesium sulphate." He adds ten drops of adrenalin to 10 cc. of the solution and injects from 5 to 7 cc. He uses a 10 cc. glass syringe with a needle 5 cm. in length.

¹⁹ MUKERJEE (S. K.). Observations from the Ophthalmic Work at the Carmichael Medical College Hospitals in 1927.—*Calcutta Med. J.* 1928. Aug. Vol. 23. No. 2. pp. 45-66. With 13 figs. (5 coloured on 3 plates).

²⁰ SEDAN (Jean). Technique spéciale de la sclérectomie chez les glaucomateux, atteints de trachome scléro-cicatriciel.—*Rev. Internat. du Trachome*. 1928. July. Vol. 5. No. 3. pp. 104-106.

²¹ HAMBURGER (C.). Treatment of Glaucoma with Glaucosan, Glaucosan Drops, and Amine-Glaucosan Drops.—*Arch. of Ophthalm.* 1926. Vol. 55. No. 6. pp. 533-544. With 3 text figs. & 5 figs. on 1 plate [10 refs.]

²² AYUYAO (Conrado D.). Intraorbital Anaesthesia in Enucleation of the Eyeball.—*Jl Philippine Islands Med. Assoc.* 1928. Apr. Vol. 8. No. 4. pp. 173-178. [College of Med., Univ. of the Philippines.]

Reports.—One always now expects to find interesting matter in the Report of the Madras Government Ophthalmic Hospital, and that for the year 1927 fulfills one's expectations. Colonel WRIGHT was absent on leave during nine months of the year under review and Major P. VERDON acted as Superintendent in his place. The large number of 4,208 in-patients was admitted and 3,537 operations (1,601 being for senile cataract) were performed upon them. The out-patients numbered 25,899 with 2,042 operations. Capsulotomy with complete iridectomy was performed on 799 of the senile cataracts, and capsulotomy with peripheral iridectomy after delivery of the lens on 561. A high percentage of immediately successful results (6.36 and better) was obtained—92.94; whilst 2.5 per cent. resulted in less than 2-60. Eight primary infections occurred with one case of suppurative panophthalmitis, and choroidal haemorrhage was met with on three occasions. In only 0.73 per cent. of the ordinary cases was there any vitreous loss at the time of operation. The iris prolapse rate was 2.1 per cent. VERDON remarks that he performed a peripheral iridectomy if the lens presented at once; but, if the lens showed any hesitation in presenting, he immediately performed a complete iridectomy. In 249 cases he executed the capsulotomy with his knife when making the section and was quite satisfied with the result. Comparing his experience of Madras patients with that of European ones he thinks the cornea of the former shows a greater tendency to relax when the section is completed, and that gaping of the wound at this stage occurs in them to a less extent than he has observed in Europe. He was unable, however, to attribute this to any increased tension in those eyes in which gaping tended to occur. Possibly collapse of the cornea may more often be found in a poorly-nourished patient whose orbital cavity contains a minimum of fat. Some interesting experiments were made with a view to determine the effect of intravenous injections of hypertonic NaCl solution upon the intra-ocular pressure. The conclusions reached were: (1) "Therapeutically the injection of strong sodium chloride solution is a valuable means of lowering the intra-ocular tension, effective in the great majority of cases and especially valuable as a pre-operative procedure; (2) following the injection, the intra-ocular tension falls and the osmotic pressure of the blood goes up, in spite of a large increase in blood volume, but it remains to be shown whether the fall in intra-ocular tension is more closely connected with the osmotic pressure or with other changes in the constitution of the blood." 30 grains of NaCl in 100 cc. was the strength of the solution used. About 20 cc. was injected during a period of not less than ten minutes. A little normal saline solution was injected before and after the hypertonic solution in order to avoid skin irritation. Two patients of the twenty treated developed some distress about fifteen minutes after the injection had been administered.

H. Kirkpatrick.

MISCELLANEOUS.

KATZENELLENBOGEN (I.). Ueber eine epidemische Glossitis in Palästina [**Epidemic Glossitis in Palestine.**]—*Arch. f. Dermat. u. Syph.* 1928. Feb. 29. Vol. 154. No. 2. pp. 269–277. [10 refs.]

Twelve cases of this affection are described selected from 68 seen by the author in the winter months December to February. Observation showed that there is an incubation period of 2–3 weeks. The state of the tongue at the various stages is described. In a quarter of the cases there was much pain. In the 3rd week the lips become inflamed, especially at the angles of the mouth and in many cases the throat becomes affected. Recovery is complete after 6–8 weeks, and there are lighter cases which recover early. Affection of the gums was never seen. The patients are labourers living on a monotonous diet, chiefly preserved food and legumes and sharing cooking utensils. By isolation and the care of cooking apparatus in one group of cases the spread was checked. In every case a smear was taken of the tongue and a culture made. Pneumococci were always found. Since according to NETTER pneumococci are present in only 4 per cent. of healthy mouths, it is concluded that the pneumococcus plays an important rôle in the aetiology of this disease. The histological findings are given. Besides the usual remedies the author employed neosalvarsan [? by injection] in a dose of 0.3 to 0.45 gm. with strikingly favourable results on symptoms, but he is doubtful whether the course of the disease was shortened. Points are detailed in which this glossitis differs from that named after MOELLER, and its relations to that described by MATHIS and GUILLET, and NOGUE and JAMIN are discussed [see this *Bulletin*, Vol. 22, p. 982–3]. The author says that this affection is one of the most frequent and most distressing of those occurring in Palestine in the rains. He intends to write another paper on this subject.

[With regard to incidence of pneumococcus in the healthy population POWELL, ATWATER and FELTON found it to be over 50 per cent. at Boston in a period of 7 months. "Practically everyone at some time during the course of a year is a carrier of a fixed type pneumococcus." In Palestine the proportion might well be less. If this glossitis is in part the result of a deficient diet, its apparent epidemic character could be explained without assuming it to be infective.]

A. G. B.

ROEGHOLT (M. N.). Bijdrage tot de miltchirurgie en tot de forensische betekenis der miltscheuring. [**Contribution to Surgery of the Spleen and to the Forensic Significance of Rupture of the Spleen.**]—*Nederl. Tijdschr. v. Geneesk.* 1928. Mar. 31. 72nd Year. 1st Half. No. 13. pp. 1582–1596. With 9 figs. on 1 plate.

The author relates his experience in Java and quotes a case, which appears to prove that spontaneous rupture of the spleen actually occurs:

A Javanese woman under hospital treatment for enlargement of her spleen suddenly died in bed from rupture of the spleen under the

eyes of the attendants. No external traumatism could be made responsible for this complication.

Roegholt thinks that often a very slight trauma may have this dramatic effect, contrary to MÜLLER's opinion (see this *Bulletin*, Vol. 23, p. 634). This standpoint is also supported by case reports.

He rejects suture of the spleen, as being impracticable in view of the friability of the malarial spleen, and recommends extirpation which—if successful—is without any untoward effect on the health. The most practical method of splenectomy is by the way of median laparotomy under general anaesthesia (to prevent any loss of time). The tail of the pancreas is carefully handled and the splenic vessels are ligated in their course through the pancreatic tunnel. Enlarged malarial spleens, causing trouble by their size or otherwise, should be extirpated if they do not react to internal treatment. In such non-urgent cases local anaesthesia is recommended, which suffices if the spleen is not adherent to the diaphragm. The author has removed the spleen in a case of hypertrophic cirrhosis of the liver (with apparent clinical success). In cases of splenic abscess the cavity should be opened and drained; any attempt to remove the spleen in such cases might be fatal.

W. J. Bais.

SAYED (F. A.). **Splenectomy and its Complications in Egyptian Splenomegaly.**—*Lancet*. 1927. June 25. pp. 1345-1346.

Like COLEMAN, the author has noticed that splenomegaly is particularly common in the Eastern Delta of Lower Egypt. It is most frequent between the ages of 16 and 30 years, but may occur at almost any period of life. During 1925 twenty-one cases of splenomegaly were operated upon. From four to eight months later the 17 survivors were in good health and at work. Although the mortality rate is high, the author believes that splenectomy is the only hope of avoiding early death in these cases.

R. T. Leiper.

COOKE (W. E.). **A Case of Early Tropical Elephantiasis treated by Protein Shock.**—*Lancet*. 1928. Feb. 25. pp. 390-391.

The patient, a white woman of 26 years, had lived in India, except for three years, since birth. In 1927 on the voyage to England, her right leg became red, painful and swollen. She was admitted to hospital on February 11th. Right leg swollen below the knee, one area being hyperaemic and tender. Right ankle measured 9½ in., left 8½ in. Groin glands on both sides enlarged; right iliac glands palpable and tender. Eosinophiles 10 per cent.; no blood parasites. Wassermann negative. Diagnosis was, commencing elephantiasis of the leg of probable filarial origin and, owing to the bacterial factor in elephantiasis, protein shock was tried. T.A.B. vaccine was given intravenously as follows:—February 25th, 50 millions: headache and vomiting with pain in enlarged glands. Temperature 103.4°. March 6th, 100 millions: temperature 101.8°, recurrence of headache and vomiting. March 12th, 200 millions: symptoms as before. March 19th, 250 millions: temperature 101.8°. On March 15th the right ankle measured one inch less and on 25th at discharge, had come down to

8½ inch. By November there had been no recurrence and the patient was travelling in India. Protein shock, the author thinks, is worth a trial in such cases.

A. G. B.

DEDICHEN (H. H.). Om transport av malariablod og forsøk med rekurrensbehandling. [**The Conveyance of Malarial Blood and Experimental Treatment with Recurrent Fever.**—*Norsk Magazin f. Lægevidenskapen*. 1928. Mar. Vol. 89. No. 3. pp. 258-263. With 2 charts in text.

The difficulties of treatment in Norway are due in part to the necessity for conveyance of the malarial blood over long distances, since the parasites can only be maintained in a living condition either in the human organism or in the anophcles. The latter are not easy to get in Norway and therefore inoculation must be employed. It has been found that the parasite carried in a gelatine medium will give successful inoculation up to 96 hours. Following PLANT and STERNER (1919) the author tried inoculation of the spirillum of recurrent fever in the treatment of paralytics in the hope that severe reactions might be avoided, and that the different strains tried might produce immunity not only towards each other, but also towards the *T. pallidum*. These hopes were not realized. The immune bodies of *S. Obermeieri*, *venezuelense* and *Duttoni* are specific and afford no protection one against one another. *S. Duttoni* was used in the present experiments. To keep an effective strain going injections had to be continued daily from one mouse into another for 4 days. Blood was drawn from the aorta and injected subcutaneously into a fresh mouse and intramuscularly into man. Inoculated white mice were obtained from Copenhagen and two cases, one of paralysis and the other of chronic epidemic encephalitis, were inoculated. In both the temperature rose, in one to 39°, but fell rapidly to normal. A secondary rise showed in one case after 14-19 days. Spirochaetes were not found in the blood and it would appear, therefore, that persistent passage through the animal body had deprived them of some at least of their pathogenicity to man. The need for frequent inoculation makes the treatment both difficult and expensive.

The author believes that if one could keep the malarial parasite alive as by the gelatine method during a journey of 96 hours, then in Norway the difficulties of the treatment even in the smallest institutions would disappear.

J. Sorley.

NYE (Robert N.), ZERFAS (Leon G.) & CORNWELL (M. Agnes). **The Presence and Importance of Yeastlike Fungi in the Gastrointestinal Tract in Pernicious Anemia, in Other Diseases and in Normal Individuals.**—*Amer. Jl. Med. Sci.* 1928. Feb. Vol. 175. No. 2. pp. 153-174. [31 refs.] [Thorndike Memorial Lab., Boston City Hosp., Boston.]

The work of ASHFORD on the presence of yeast cells in sprue and the reports of WOOD on the discovery of *Monilia psilosis* in pernicious

anaemia, have stimulated the authors to reinvestigate the whole subject of the rôle played by these fungi in the gastro-intestinal tract and also to study the classification of isolated strains.

The isolation of yeast-like fungi from the stools or gastric contents is extremely easy, because they will grow on a medium with an acidity usually sufficient to prevent growth of ordinary intestinal bacteria. The morphology, mycelium, ascospore formation and cultural characteristics were investigated in every case.

The fermentation results obtained after four days' incubation were thought to be more accurate than those after fourteen days: 192 stools were cultured from 121 individuals and 31 gastric contents from 29 individuals. Tables were then constructed which indicated that much of the confusion in the literature of the yeast-like fungi arises from the variety of generic names given to apparently identical organisms. For instance, *Oidium*, *Monilia*, *Saccharomyces*, *Endomyces*, *Parasaccharomyces* and *Blastomyces* were all used to name, apparently, the same fungus. Yeast-like fungi were found in 51 cases, or 42 per cent. of the material investigated. Similar organisms were recovered from 72 per cent. of gastric contents. It was decided not to call a stool or gastric sample positive unless 10 or more colonies were obtained on the first culture. From 16 cases with diarrhoea, four stools were positive. The incidence of yeast-like fungi in stools from pernicious anaemia is somewhat higher than in the stools from cases of miscellaneous disease. Only one strain was obtained from the stools of normal persons.

The cultivation of gastric contents gave dissimilar results. The incidence in cases with pernicious anaemia is distinctly higher than in the miscellaneous disease group. The cases without achylia show a relatively low incidence. The outstanding feature of the results of stool culture is that *Parasaccharomyces* A. was the only yeast-like fungus recovered on the first attempt and in appreciable numbers. Members of this group could not be differentiated from *Monilia psilosis* and are apparently identical with *M. albicans*. It seems likely that organisms of this class are of relatively common occurrence in the mouth and gastro-intestinal tract and that their presence has no clinical significance. In conditions of general debility the normal defences of the body are broken down and these yeast-like fungi are able to invade the oral mucosa producing the typical membrane of thrush.

The well known point in regard to *Monilia psilosis* is that rabbits are invariably killed by intravenous injections of suitable amounts of culture. The most striking lesions found at autopsy are the miliary abscesses in the cortices of the kidneys. This is not specific as strains of other yeasts will do the same. The experiments would seem to indicate that this group of yeast-like fungi is not particularly pathogenic for rabbits. The minimal lethal intravenous doses are relatively large and the invasive process slight. The blocking of the renal capillaries is followed by abscess formation and destruction of the renal parenchyma, death being due to uraemia. In the past, every yeast-like fungus isolated from the blood, sputum or stool has been given a new specific name without comparison with previous strains and has been called pathogenic merely because it was recovered from a diseased condition and produced fatal lesions in rabbits on intravenous injection.

It has been found impossible to confirm the findings of ASHFORD or WOOD (See this *Bulletin*. Vol. 22. pp. 371 and 758-9).

[The results agree in the main with the conclusions arrived at by the reviewer in his Report on Researches on Sprue in Ceylon 1912-1914 (1915. pp. 90 and 91).]

P. H. Manson-Bahr.

SNIJDEERS (E. P.). De longontsteking bij de tropische volken. [**Pneumonia in Tropical Populations.**].—*Nederl. Tijdschr. v. Geneesk.* 1928. Mar. 17. 72nd Year. 1st Half. No. 11. pp. 1278-1288. With 4 charts in text. [11 refs.]

This is a clinical lecture in connexion with the demonstration of 5 cases of lobar pneumonia, 4 in Javanese, 1 in a Chinese.

The clinical peculiarities of pneumonia in the Asiatic are related: the dyspnoea is hardly ever severe; the patient generally makes a more quiet impression than the European sufferer from pneumonia; herpes is very rare, rusty sputa are comparatively so; the onset of the fever is usually acute, but its course is more often irregular and long lasting, the general symptoms often precede the local signs of infiltration of the lung for several days; the localization of the affections is more variable than in Europe; there exists more predilection for the right central lobe.

The prevalence of pneumonia in the Dutch East Indies is shown by several statistics, from which also the often noticeable epidemic character of the disease is apparent. Bad housing conditions (overcrowding, insufficient ventilation), poor physical condition of the inhabitants and climatic influences may account for such epidemics, especially occurring in prisons, immigrant ships, etc. Improvement of the housing accommodatoin, especially "spacing out" of the sleeping places, give the best results in combating these epidemics.

Pneumococcal diseases without pulmonary manifestations are more common in the tropics than in Europe.

W. J. Bais.

DE CASTRO (A. Bayley). **A Note on the Value of Rectal Injections of Potassium Permanganate in the Treatment of Pneumonia.**—*Indian Med. Gaz.* 1928. Mar. Vol. 63. No. 3. pp. 120-123. With 5 charts.

NOTT having reported in the *British Medical Journal* (July 17, 1926) on the value of rectal injections of permanganate of potassium solution in the treatment of pneumonia, Lt. Bayley de Castro, I.M.D., has tried the method at Port Blair, treating 22 cases with 50 per cent. of recoveries. He notes rapid disappearance of respiratory discomfort, early fall in temperature, early commencement of and ease in expectoration and general improvement. "A 50 per cent. mortality," he says "represents a real reduction." Other treatment was usually followed as well. The solution of 2 grains to the pint is introduced warm, from 4 oz. up to one pint 3 or 4 times a day. Notes are given of seven cases. The rationale is unexplained.

A. G. B.

VAN DER GUGTEN (F. E.). Opmerkingen betreffende nier-en blaassteenlijden. [**Remarks on Kidney and Bladder Stones.**—*Geneesk. Tijdschr. v. Nederl.-Indië* 1928. Vol. 68. No. 1. pp. 61-67.]

This article contains many short practical hints for operative intervention in the cases of stones of the kidney and bladder. The following represents a selection.

In children conservative treatment is justified, since the chances of spontaneous voiding of the stones are greater than in adults; complications or serious symptoms may furnish indications for operation. In aged people the general condition puts certain limits to operability. In otherwise healthy individuals full information should be obtained regarding the size, number and situation of the stones, the condition of the urinary passages and the function of the kidneys. In bilateral affections the most seriously affected side should first be dealt with. Large stones, filling up the whole pelvis, are generally accompanied by serious affection of the specific tissue of the kidney and by infection and consequently lead to nephrectomy. Smaller stones and ureteral stones may be voided under influence of glycerine injections into the pelvis. Stones in the lower part of the ureter sometimes find their way into the bladder after cauterization of the ureteral opening. Large bladderstones in males require high section, smaller stones in men and even fairly large ones in women may be treated with lithotripsy and aspiration.

The author, a surgeon, pleads for collaboration with the internist in such urologic cases, but the demands he puts on the diagnostic capacities of the internist hardly fall within the limits of this specialism.

As regards prophylaxis, attention is drawn to avitaminosis A as a cause of stone formation in the urinary passages.

W. J. Bais.

MIYAMOTO (Kazuo) & KORB (J. H.). **Meniscocytosis (Latent Sick Cell Anemia): its Incidence in St. Louis.**—*Southern Med. J.* 1927. Dec. Vol. 20. No. 12. pp. 912-916. [13 refs.] [Barnes Hosp. & School of Med., Washington Univ., St. Louis, Mo.]

The conclusion here is that meniscocytosis (latent sickle-cell anaemia) is a relatively common condition in negroes. It was observed by the authors in 6.3 per cent. of 300 negroes in wards in St. Louis institutions, but not in any of 100 white patients. The negroes with meniscocytosis seemed as normal as other negroes and could only be distinguished by specially prepared blood-films

A. Alcock.

HAHN (E. Vernon). **Sickle-Cell (Drepanocytic) Anemia. With Report of a Second Case Successfully Treated by Splenectomy and Further Observations on the Mechanism of Sickle-Cell Formation.**—*Amer. J. Med. Sci.* 1928. Feb. Vol. 175. No. 2. pp. 206-217. With 1 text fig. & 3 figs. on 2 plates. [13 refs.] [Lab. of Surg. Path., Indiana Univ. School of Med., Indiana.]

Since the history, race-restriction, pathology, and haematology of sickle-cell anaemia have quite recently been reviewed in this *Bulletin*, it will be sufficient now to pay attention to the particular case upon which this paper is based.

The patient was an emaciated "coloured" infant of 18 months, brought to hospital with a complaint of persistent cough, drowsiness, and vomiting. There was evidence of rickets and of bronchopneumonia. At one time at least there was high fever. The sclerae had a peculiar greenish tint, the superficial lymphatic glands were enlarged, the belly was big, and the liver and spleen were much enlarged. A blood smear showed numerous poecilocytes, sickle-cells, and nucleated red cells; after standing one hour at room temperature, all the red cells in a sealed wet smear had become sickles. The average leucocyte percentages were, polymorphs 49, lymphocytes 46, large uninuclears 2, eosinophils 2, basophils 1. The red cell resistance was increased. About ten weeks after admission the patient's spleen was removed. The wound healed well; after the tenth day the temperature became normal; and cough and drowsiness and vomiting ceased. When the child was re-admitted for examination four months after operation, it was free from symptoms and appeared well nourished; but there was still some evidence of rickets, of enlargement of lymph-glands and of liver, and of thickening of the right lung, and in a sealed wet blood smear allowed to stand as before, all the red cells had become falciform.

The excised spleen was about four times normal size; the capsule was thickened and scarred, the cut surface was very dark and almost gelatinous, and the Malpighian bodies were hardly visible. Microscopic study of sections showed intense congestion and even massed infarction of the pulp with red blood cells, but no increase of connective tissue; in the sections of formal-fixed spleen the red cells were falciform, in Zenker-fixed sections almost all were circular.

A. Alcock.

MANDRY (Oscar Costa) & MARÍN (R. A.). **Study of an Outbreak of Diarrhea in a Convict Camp near San Juan.**—*Porto Rico Rev. of Public Health & Trop. Med.* 1928. Feb. Vol. 3. No. 8. pp. 311–320. With 1 diagram. [4 refs.] [School of Trop. Med., Univ., Porto Rico.]

The outbreak of diarrhoea was investigated thoroughly by the authors; thirty-two out of forty persons, living under the same conditions in the convict camps, were affected. No bacterium or protozoa was found that could be considered responsible. No typhoid dysentery group organisms were found, and *E. histolytica* was ruled out on the basis of comparative incidence. Anaërobic cultures were not made—an anaërobe may possibly have been the cause; or this may have been a non-living chemical irritant derived from or associated with one of the foodstuffs in the common dietary.

H. M. Hanschell.

REVIEWS AND NOTICES.

BAER (Jean G.) [Docteur ès Sciences, Institut de Zoologie, Université de Neuchâtel (Suisse).] Supplément X. Monographie des cestodes de la famille des Anoplocephalidae. [**Monograph on the Cestodes of the Family Anoplocephalidae.**]—*Suppléments au Bulletin Biologique de France et de Belgique*. 1927. pp. vi+241. With 43 figs. & 24 figs. on 4 plates. Paris: Laboratoire d'Evolution des Êtres organisés, 105 Boulevard Raspail, Les Presses universitaires de France, 49 Boulevard Saint-Michel. London: Dulau & Co., 34-36, Margaret Street, Cavendish Sq. [60 fr.]

The family *Anoplocephalidae* created by FUHRMANN in 1907 now contains 28 genera and 114 species. Of these 84 species occur in mammals, 17 in birds and 13 in reptiles. The mammalian parasites are found chiefly in Marsupials (22 species), Ungulates (27 species) and Rodents (18 species). Primates are infested by four species, while Man is but rarely parasitized. The species *Bertiella studeri* Blanchard 1891, is the only record listed. This parasite has a wide distribution in Africa and tropical Asia, occurring in the monkeys *Simia satyrus*, *Anthropithecus troglodytes*, *Hyllobates hoorelock*, *Cercopithecus pygerythrus*, *Cercopithecus schmidtii*, *Cynomolgus sinicus* and *Cynomolgus fascicularis*. This extensive list of hosts is the result of a fusion of several species, viz. *Taenia satyri*, *Bertiella conferta*, *Bertia polyorchis* and *Bertiella cercopitheci*, all of which the author's researches have shown to be synonymous with *Bertiella studeri*. The monograph gives an admirable summary of the morphology and classification of this somewhat difficult family. The literature has been carefully collated and a most useful host-list is added. The author discusses briefly the problem of transmission which has not yet been solved for any species in this family. He notes finally that the common infection of lambs with *Monezia* is entirely absent from Switzerland.

R. T. Leiper

LEPROSY NOTES. 1928. July. No. 2. 28 pp. Issued Quarterly by the British Empire Leprosy Relief Association. 24, Cavendish Square, London, W.1.

These Notes, written for the greater part in a popular style, should serve a useful purpose in the propaganda work of the British Empire Leprosy Relief Association. In attempting to answer the question. Is there a cure for leprosy? MUIR points out the resemblance of the disease to tuberculosis in its insidious onset and the need of a suitable soil and environment for its development. In those countries where leprosy is prevalent there are probably many potential lepers who show no signs of active disease. Under these circumstances no wise physician will pronounce a cure. At the same time the recent advances in treatment have induced both patients and employers to adopt a more hopeful outlook and to hold a more humane conception of leprosy. To stamp out such a chronic disease the value of the institution of propaganda-treatment-survey centres in the endemic areas is emphasized. By such means, in addition to the education of both natives and doctors, any predisposing causes, such for example as guinea-worm, may be traced and eliminated. For the breaking down of lepromata the oral administration of potassium iodide used in conjunction with chaulmoogra oil is recommended, especially in LEBOEUF's three classes of patients. The reaction produced by iodides is readily controlled owing to their rapid elimination from the body. "Iodides not only break down the leproma, but also indirectly produce auto-vaccination." The drug is again of great value in establishing the diagnosis and confirming the cure

of the disease. Dr. Marie WARDMAN also confirms the value of iodide treatment. In briefly discussing the bearing on prophylaxis of recent advances in treatment, ROGERS advises the repeated examination every six months for five years of all contacts for the purpose of identifying early cases. In 80 per cent. of infections through living in the same house as a leper, the incubation period before the early symptoms appear is under five years. It is by such a procedure that the possibility of stamping out the disease might be attained. TRAVERS briefly describes the good results obtained by the oral administration of *Hydnocarpus anthelmintica* seeds, the so-called Tai Foong Chee treatment. The crushed seeds are given as a powder in the proportion of 3 parts *H. anthelmintica* and 1 part of *Cannabis indica*, one half drachm of the mixed powder being given twice daily after food. Among its several convenient features are mentioned the low cost of the drug and its suitability for women and children, together with the little or no toxic reaction observed by its use. In the Southern Anglo-Egyptian Sudan FRASER reports the increase of the disease during the last few years, the obvious contributory causes being the erratic annual rainfalls, with the subsequent local famines, and the improvidence of the people themselves. Here the District Commissioners have done much to help the situation. The natives have learned the contagious nature of leprosy and to show more confidence in the medical facilities offered to them, while such provision is much hampered through lack of funds. The proposed scheme of procedure in Teso, Uganda, where 1 per cent. of the natives are lepers, is outlined. A short account of the work at the Chacachacare Leper Settlement, Trinidad, with its 447 inmates, is given by the Medical Superintendent. The Honorary Secretary of the Indian Council of the Relief Association furnishes a short report of the work done by the Council during the 3 years of its existence.

These abstracts will give some idea of the value of this booklet.

W. Jenkins Oliver.

KHARTOUM. The Kitchener School of Medicine, Khartoum. Second Report, 1926-27. [ATKEY (O. F. H.).—56 pp. With 5 plates.

The usefulness of this most interesting report will certainly not be confined to the Sudan. As the medical training of African natives in British Colonies develops there is little doubt that this record and subsequent reports from the same source will serve as valuable guides and works of reference. It is a pioneer document and although wholly concerned with the problems of medical education as they affect the Sudan, it indicates certain sound principles which have a wider application and provides information which cannot fail to be of service elsewhere.

Attractive in form, for it is exceptionally well printed and illustrated, it possesses rather a special feature in that there is a résumé of the first report, a useful provision which tells from its beginning the story of an undertaking that marks a new era in the history of the Sudan and the importance of which can scarcely be overrated.

The Medical School, founded as a memorial to Lord Kitchener, was opened by Sir Lee Stack in 1924. Its aim and objects are thus described :

"(a) To train carefully selected students of the Gordon Memorial College as doctors in order that they may carry out Medical and Health work in their own country, and thus not only to bring medical help within the reach of the large number of their own countrymen who are out of reach of all medical assistance, but also by preventive measures to raise the general standard of health throughout the country.

"(b) As the need arises, to provide post-graduate classes for doctors who have been trained at this School.

"(c) By working in close co-operation with the Medical Research Laboratories, to inculcate the spirit of clinical research and to afford facilities for such research to graduates who show this aptitude."

The course is one of four years' duration, followed in every case by a year's work as house-surgeon or house-physician at one of the larger hospitals. It is defined as "a sound scientific but somewhat simplified medical training." The details given certainly confirm this statement. It is hoped that eventually the medical work of the Sudan will be entirely conducted by graduates from this School with the exception of a small cadre of British doctors, specialists in medicine, surgery, public health or medical administration.

Care is taken to limit the number of students. Thus when the School opened ten were admitted. In 1925 there were eight new students. In 1926 no fresh students were enrolled, but in January, 1927, ten new students from the Gordon College commenced the first year course of studies. The students are under close surveillance. Those who fail in their examinations are either referred back for a further course of study in the subjects wherein they have failed to satisfy the examiners or, if deemed wholly unsuitable, are recommended to discontinue their studies and are given Government employment.

Progress has been steady and we learn from the report that in December, 1927, seven of the original ten students who entered the School in 1924 passed the final examination and were granted licences to practise medicine and surgery within the borders of the Sudan. They now hold hospital house appointments. Those of them who exhibit the necessary knowledge, skill and administrative ability will be placed in charge of certain of the smaller hospitals. Those who do not will remain for a further period under supervision at one of the larger hospitals.

An interesting photograph shows a group of these graduates with a Sudanese benefactor of the School. When one remembers that little more than a generation ago the Sudan was in a state of savagery and barbarism this picture is a remarkable testimony to the beneficent work of the civilizing Power.

The method of conducting the examinations is described. In 1926 one assessor was appointed from Egypt, in 1927 both a surgical and a medical assessor were invited to attend. The report of the assessor for 1926 and that of the assessors for 1927 are given as appendices and merit careful attention. They are distinctly favourable, but make certain recommendations for improving both the teaching and the examinations. Those in the 1927 report are as follows:—

"(1) Still greater care to be paid to the practical side of the medical work, especially in regard to Practical Pathology in which we are of the opinion that a supplementary examination should be held at the same time as the other examinations, more particularly in regard to clinical pathological subjects.

"(2) As soon as possible the institution of a Pathological Museum in the new Medical Research Laboratories opposite the School.

"(3) The construction of a Graphic Museum on the model of that now existing at the Bureau of Tropical Research [*sic*] in Endsleigh Gardens. This will be of extreme value, more particularly in the consideration of Tropical Diseases; and in regard to the encouragement of visual education and memorisation by Sudanese doctors on their periodical return for post-graduate courses of instruction.

"(4) Further instruction in X-ray and radiographic examinations in connexion with clinical subjects."

The new Medical Research Laboratories above mentioned, which take the place of the medical section of the Wellcome Tropical Research Laboratories formerly at the Gordon College, occupy a building in the Hospital enclosure, immediately opposite the Medical School. An aerial photograph shows that the building containing them is identical in external structure with that which houses the School. These two buildings flank the southern end of the long, wide and tree-fringed avenue which runs from the railway station to the palace gardens. It is expected that the

laboratories on their new site will greatly assist the teaching both of pathology and of clinical work.

A School Hostel has also been erected and can accommodate forty students.

At the Gordon College itself preliminary scientific teaching has been given to fourth-year students since January, 1926, so that students starting work at the Medical School are not handicapped by the lack of a scientific vocabulary and the absence of any knowledge of science and its applications.

The Government has provided scholarships for suitable students who, without monetary aid, would be unable to complete their medical studies.

There is a list of the teaching Staff, the members of which are, for the most part, officials of the Sudan Medical Service, but, to ensure continuity of teaching in biology, a lecturer in that subject has been appointed.

The curriculum is described and one of the appendices gives the revised syllabus in detail. This is a very useful addition and will be helpful in other parts of British tropical Africa. It has evidently been the subject of careful consideration and would appear well calculated to fulfil the purpose for which it is intended, the large provision for practical work being specially noteworthy. One small criticism only may be advanced. Under blood work nothing is said about instruction in those fallacies and puzzles which form pitfalls for the unwary and which it is specially necessary to guard against in a country like the Sudan.

The demonstrations given in connexion with the public health course are excellent.

The Report contains an account of the presentation of the diplomas and of the Governor-General's admirable speech on that occasion. It is interesting to note that each student was called on to swear the Oath of Hippocrates, which was recited in Arabic.

Finally there is a financial statement, which recalls a passage from the Assessor's Report for 1926 to this effect:—

"The foundation of the Gordon Memorial College, the extraordinary advantage of being able to make use of the facilities afforded by the Wellcome Tropical Research Laboratories and the existence of a most skilled and efficient teaching staff in all the scientific subjects already in Khartoum, obviate the necessity of importing expensive professors from abroad, and result in the institution of what is probably the cheapest, consistent with efficiency, School of Medicine in the world."

Mr. O. F. H. Atkey, who signs the report and who is President of the School Council and Director of the Sudan Medical Service, is to be heartily congratulated on this record of work and on the manner in which the Kitchener School of Medicine has developed and is being conducted. He and his colleagues have devoted themselves to the task with a well-regulated enthusiasm which is meeting with its just reward, and anyone who reads this report is likely to agree with the third paragraph under the heading "Dedication," which runs:—

"Every year that has elapsed since Lord Kitchener's death has served to emphasize his wisdom and foresight in this matter."

Andrew Balfour.

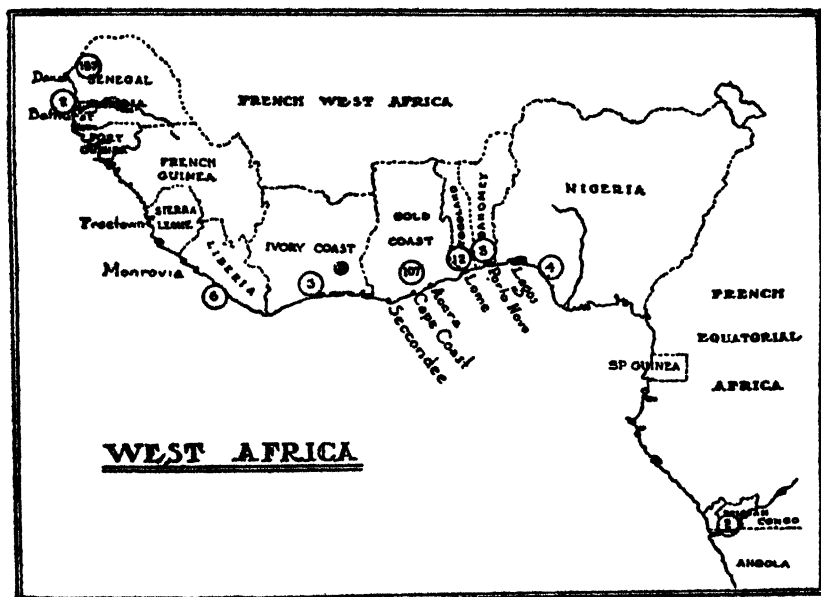
ROCKEFELLER FOUNDATION. **Annual Report 1927.** [VINCENT (George E.)]—pp. ix+385. With numerous illustrations. Rockefeller Foundation, 61, Broadway, New York.

The disbursements of the Foundation for the year 1927 amounted to 11,223,124 dollars. Most of this expenditure was on multifarious Public Health Services and Medical Education, but under the heading of "Miscellaneous" expenses there is an item of 1,943,005 dollars for the purchase of the Bedford Square site of the University of London, another item of

235,802 dollars for education of nurses, and there are numerous items, to a total sum of 535,739 dollars, for fellowships and grants-in-aid for pure science (anthropology, biology, chemistry, mathematics, and physics).

Of the expenditure on Public Health 1,772,864 dollars represents the cost of the year's activities in the world-wide field of sanitation, and under the heading of Public Health Education (as distinct from medical education) another sum of 1,866,506 dollars stands for building, equipment, endowment, or maintenance of 14 schools and institutes of hygiene in 11 countries of America and Europe and for travelling fellowships in hygiene; and 146,348 dollars is a contribution to the Health machinery of the League of Nations. In the Public Health programme may be noticed, among interesting headings of expenditure. Yellow Fever, 460,728 dollars; Malaria, 288,088 dollars; Hookworm Disease, 322,902 dollars.

The study of yellow fever was continued in West Africa with mingled success and loss; for although the Foundation's Commission at last discovered in the common Rhesus monkey a susceptible animal for laboratory purposes, it suffered a grievous blow by the tragic death, in the hour of triumph, of one of the most brilliant and most competent of its band of workers—the devoted Dr. Adrian STOKES. In the Western Hemisphere yellow fever control was specially called for only in Brazil.



Countries on the west coast of Africa where yellow fever occurred during 1927. The figures within the circles show the number of cases reported in the various areas.

[Reproduced from the *Annual Report of the Rockefeller Foundation for 1927.*]

Antimalaria work—including drainage and other anti-larva operations, and biological and various experimental studies in the field—was assisted, financially or otherwise, in Albania, Argentina, Brazil, Bulgaria, Ceylon, Italy, the Netherlands, Palestine, Porto Rico, Spain (Cáceres), and Venezuela and also in seven States of the Union. It is satisfactory to notice that in Italy the non-spectacular but pregnant study of regions where anopheles mosquitoes are present though malaria may no longer exist has been taken up.

The study, treatment, and control of hookworm disease was either supervised or assisted with funds or personnel in 23 countries, from Colombia

and Paraguay eastwards to the isles of the Pacific. The studies of P. D. LAMSON on treatment show that dogs could not stand large doses of carbon tetrachloride on a diet deficient in calcium, and that symptoms produced in dogs in such circumstances were relieved by calcium; also that among the conditions that may render carbon tetrachloride dangerous for man are a recent indulgence in alcohol, a collection of undigested food, and a heavy infestation with ascaris.

The Foundation has widely and consistently sought the development of rural hygiene and sanitation—an enterprise that was the natural outcome of hookworm prevention. Beginning with the control of prevalent and infectious diseases, it aims at higher attainments—nursing, infant welfare, school sanitation, milk supplies, vaccination, health lectures, and all the rest. In 1927 financial support was given to 23 States of the U.S.A. and also in Austria, Brazil, Canada, Ceylon, China, Czechoslovakia, France, Hungary, India, Poland, Porto Rico, Siam, the Straits Settlements, and Yugoslavia for this sort of rural health business. In the Mississippi basin further generous aid was administered through these local rural health centres to sufferers from the great floods.

In other special directions the Foundation has played the part of Pro-culeius to sanitary engineering works in many States of the Union and of Central America and in Ceylon; to the establishment and maintenance of public health laboratories in America, the Philippines, and Hungary; and to the development, organization, or amplification of various public health services in America, Angora, Bulgaria, Denmark, Finland, France, Hungary, and Sarawak.

Expenditure of 4,097,343 dollars was incurred on account of Medical Education, as distinct from public health training, but including minor subjects classed as preliminary medical. Much the greatest part was consumed under headings of building, equipment, maintenance, or endowment of 21 medical schools and colleges in 14 states of Europe, Asia, and America. Among the beneficiaries are the medical schools of Cambridge, Edinburgh, London Hospital, and University College. In addition, help was given to 13 premedical schools and 16 hospitals in China. It is noted that notwithstanding the turmoil in China, some good judges on the spot think that the future of medical education in that country will be serene; they are pleased with the way in which, after foreigners had been compelled to leave, some of the Chinese doctors managed hospitals and schools and even colleges. The Peking Union Hospital and Medical College being outside the storm centre suffered nothing worse than occasional acute fits of anxiety. In the hospital 4,217 patients were treated and 108,565 out-patients; there were 224 deaths in hospital, where 114 post-mortem examinations were made—a remarkable contrast to the Chinese experiences recorded by Sir Patrick MANSON in the year 1874.

The Foundation financed 111 foreign fellowships to investigators representing 32 countries, from Canada and Peru to Japan and the Philippines. It also provided 127 fellowships and scholarships for China, and contributed to 59 fellowships administered by national Research Councils in America and England. It also gave financial or other assistance to 20 research students attached to institutions in France and Italy and to numerous workers in laboratories in 10 other countries, and it continued to supply medical literature to 260 institutions in 19 countries.

A. Alcock.

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Am. signifies Amoebiasis and Amoebic Dysentery.	Lab. „ Laboratory Reports.
Bb. „ Beriberi.	Lep. signifies Leprosy.
Bl. „ Blackwater.	Mal. „ Malaria.
B.R. „ Book Review.	Misc. „ Miscellaneous.
Chl. „ Cholera.	Myc. „ Tropical Mycology.
C.Bu. „ Climatic Bubo.	Oph. „ Tropical Ophthalmology.
Der. „ Tropical Dermatology.	Pel. „ Pellagra.
Dys. „ Dysentery (Bacillary and Unclassed).	Pl. „ Plague.
Ent. „ Enteric Fevers.	Rab. „ Rabies.
Fev. „ Fevers.	R.F. „ Relapsing Fever and Other Spirochaetoses.
G.V. „ Granuloma Venereum.	Sp. „ Sprue.
Hel. „ Helminthiasis.	S.S. „ Sleeping Sickness.
Hist. „ Historical.	Tb. „ Tuberculosis.
H.S. „ Heat Stroke.	Und. „ Undulant and Abortus Fever.
Jaun. „ Infectious Jaundice.	Y.F. „ Yellow Fever.
K.A. „ Kala Azar.	Y. & S. „ Yaws & Syphilis.
	Z. „ Medical Zoology.

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 Aldershoff, H., 120 (Mal.)
 Aleixo, A., 639 (Lep.)
 Alexieff, A., 240 (Dys.), 623 (Am.)
 Alfeeva, S., 465 (Hel.)
 Allan, W., 316 (Pl.)
 Allen, H., 323 (H.S.)
 Allison, J. R., 697 (Der.)
 — Almeida, F. P., with Campos, 745 (Myc.)
 — & Dos Santos, L. F., 746 (Myc.)
 de Almeida, T., (211) (Lep.)
 Alvarez Soto, N., with Mazza, Forté & Arias Aranda, 133 (Mal.)
 d'Amato, H. J., 219 (Am.)
 Ambrosoli, G. A., 29 (Der.)
 Amoss, H. L., 929 (B.R.)
 Anderson, C. & de Lagoanère, J. L., 947 (Hel.)
 —, with Nicolle, 83 *ter*, 85, 90 *bis*, 91 *ter*, 586, 596 (R.F.)
 —, with — & Colas-Belcour, 89 *bis*, (599) (R.F.)
 Anderson, C. M., (197) (Rab.)
 Anderson, C. W. & Cowdry, E. V., 728 (Z.)
 Anderson, I. R., 437 (Bb.)
 Anderson, J., (157) (Mal.)
 Anderson, S. M., with Manson-Bahr, 14 (G.V.)
 Anderson, T. E., with Levaditi, 593 (R.F.)
 Anderson, T. F., 37 (Der.)
 Ando, A. & Tohtaro, K., 453 (Hel.)
 André, Z., with Labernadie, 651, 978 (Lep.)
 Andrei, G., 678 (Chl.)
 Andrews, J. M., 77 (K.A.)
 d'Anfreuille de la Salle (500) (Misc.)
 Angel-Marin, R., 948 (Hel.)
 Antonelli, G., 133 (Mal.)
 Aragão, H. de B., 262 (Z.), 852 (Y.F.), 860 *bis* (K.A.)
 Aragonés, F., 428 (K.A.)
 Arathoon, 924 (Misc.)
 Araujo, C. de S., 985, 988 (Lep.)
 de Araujo, E., 612 (Jaun.), (855) (Y.F.)
 Araujo, H. C. de S., 426 (K.A.), 648, (654) (Lep.)

- Araujo, O. da S., (211) (Lep.)
 Araujo, O. S., 652 (Lep.)
 Aravantinos, J. D., 96 (R.F.)
 Arbeiten ueber Tropenkrankheiten und deren
 Grenzgebiete, 250 (B.R.)
 Archer, with Ledoux & Clerc, 512 (Und.)
 Arcos, G., 200, 640 (Lep.)
 Arias, F. J., with Vidal Guemes, 36 (Der.)
 Arias Aranda, C., with Mazza, Forté & Alvarez
 Soto, 133 (Mal.)
 Arinkin, M., 492 (Misc.)
 Arisawa, T., 628 (Dys.)
 Arjona, V. R., 35 (Der.)
 Arlo, 551 *bis* (Mal.)
 Armstrong, C. L., 641 (Lep.)
 Arnold, L. 307 (Chl.)
 — & Miller, W. E., 48 (Und.)
 Arquivos Indo-Portugueses de Medicina e
 Historia Natural, Nova Goa, 209 (Lep.)
 Artamonow, A. S., 423 (K.A.)
 Asada, J., 459, 942 (Hel.)
 Ascoli, V., (157) (Mal.)
 Ash, J. E., with Reed, 688 (Sp.)
 Ashner, M., with Kligler, 850 (Y.F.)
 Assam, 193 (Rab.)
 Association of Medical Officers of Missionary
 Societies, 584 (B.R.)
 de Assumpção, L., 731 (Z.)
 Atkey, O. F. H., 1004 (B.R.)
 Audibert, 546, 845 (Y.F.)
 Aujeszký, A., 193 *bis* (Rab.)
 Auricchio, L., 69 (K.A.)
 Austen, E. E., 842 (B.R.)
 Avery, S. D., with Bates, 487 (Misc.)
 Avezu, G., (197) (Rab.)
 Ayuyao, C. D., 657 (Y. & S.), 994 (Oph.)
 de Azevedo, A. P., with Torres, 132 (Mal.)
 Aznar, P., 88 (R.F.)
- B**
- Babel, J. & Mesnard, J., 402 (Misc.)
 Babonneix, Touraine & Widiez, 203 (Lep.)
 Bachman, G. W., 470, 963 (Hel.)
 Ba Chow, J., 620 (Am.)
 Bacigalupo, J., 722 (Z.), 952, 973 (Hel.)
 Bacqué, M., with Mathis & Cazanove, 545
 (Y.F.)
 Baer, J. G., 952 (Hel.), 1003 (B.R.)
 —, with Joyeux, 460 (Hel.)
 Baermann, G. & Smits, E., 604, 605 (Jaun.)
 — & Zuelzer, M., 602 (Jaun.)
 Bagchi, B. N., with Bose & Dastidar, 857
 (K.A.)
 Bagchi, K. N., with Ross & Roy, 677 (Chl.)
 Bailey, B. N. V., 492 (Misc.)
 Bailly, J., with Remlinger, 196 *bis*, 708, 711,
 713 (Rab.), 987 (Lep.)
 Bailly, J. D., with Covell, 127 (Mal.)
 Baize, with Morvan & Voizard, 448 (Hel.)
 Baker, D. W., with Carpenter, 50 (Und.)
 Bakker, C., 478 (Oph.)
 Balfour, A., 276 (Z.), 550 (Mal.), 921 (Misc.)
 Balfour, M. C., 811 (Z.)
 Balda, P. L., (654) (Lep.)
 Ballif, L. & Gherscovic, I., 445 (Pel.)
 Banerjee, R. N., 52 (Fev.)
 Banerjee, S. C., with Brahmachari, 860 (K.A.)
 Banerjee, S. M., 435 (Bb.)
 Banerjee, S. N., (313) (Chl.)
 Banerji, R. N., 402 (Misc.), 868 (Bb.)
 von Bánszky, L. & Kremer, W., (927) (Misc.)
 Baranoff, N., with Kisilitschenko, 282 (Z.)
 Barber, M. A., 808 (Z.), (157) (Mal.)
 — & King, C. H., 805 (Z.)
 — & Komp, W. H. W., 277 (Z.) 917 (Misc.)
 —, — & Hayne, T. B., 124 (Mal.)
 —, with Maxcy & Komp, 558 (Mal.)
 Bard, L., 156 (Mal.)
 Bargehr, P., 203 (Lep.)
 Barlovatz, 486 (Misc.)
 Barnett, L. E., 461 (Hel.)
 Baroni, V., 190 (Rab.)
 Barraud, P. J., 286, (737) (Z.)
 — & Covell, G., 814 (Z.)
 Barreto, J. de B., with Pinto & Fialho, 829 (Z.)
 Basile, C., 265 (Z.)
 Basile, G., 131 (Mal.)
 Basset, J. & Laborderie, 714 (Rab.)
 Bassett-Smith, P., 40 (Und.)
 Bastai, P., 511 (Und.)
 Basu, C. C., 78 (K.A.)
 Basu, N. K., with Chopra & Gupta, 68, 420
 (K.A.)
 Basu, P. N., 403 (Misc.)
 Bates, L. B. & Avery, S. D., 487 (Misc.)
 Battaglia, M., (157) (Mal.)
 Bauer, J. H., 109 (Jaun.), 848 (Y.F.)
 —, & Hudson, N. P., 848 (Y.F.)
 —, with Sawyer, 545 (Y.F.)
 —, with Stokes & Hudson, 537, 538 (Y.F.)
 Baumgartner, E. A., 58 (Sp.)
 — & Smith, G. D., 56 (Sp.)
 Bauvallet, H., 848 (Y.F.)
 Baylis, H. A., 973 (Hel.)
 Bayon, H. P., 641 (Lep.), 836 (Z.)
 Beattie, M. V. F., 826 (Z.)
 Beatty, N., with Rice, 715 (Rab.)
 Bedier, E. & van dam Trinh, 6 (Y. & S.)
 Beeson, B. B., 184 (Hist.)
 Behdjat, H., 74 (K.A.)
 —, with Hodara, 34 (Der.)
 Beijnen, G. J. W. K., 370 (Misc.)
 de Bellard, E. P., 667 *bis* (C.Bu.)
 Bello, C. J., with Chacin Itriago, 831 (Z.)
 Belyea, G. N., 42 (Und.)
 Bender, W. L., 414 (Misc.)
 Benecke, 566 (Mal.)
 Bengal, 552 (Mal.)
 Bensted, H. J., with Perry, 624 (Dys.)
 Bentmann, E., 578 (Mal.)
 Benton, D., with Low, 58 (Sp.)
 Bequaert, J., 736 (Z.) 935 (Hel.)
 Berdnikov, A., 628 (Dys.)
 Bernard, E., with Bezançon, 617 (Am.)
 — & Gilbert-Dreyfus, 101 (Jaun.)
 Bernard, L. M. J., 946 (Hel.)
 Bernard, R., 10 (Y. & S.), 371, (500) (Misc.)
 Berri, J. C., 17 (G. V.)
 Bersenieff, A. P., 631 (Dys.)
 Bertillon, with Gougerot & Roques, 670 (G.V.)
 Bertrand, I., with Gosset & Magrou, 751 (Myc.)
 Beschkina, R. I., 595 (R.F.)
 Beselin, O., 562 (Mal.)
 Besredka, A., 490 (Misc.)
 Béteau, J. P., 225, 622 (Am.)
 Bevan, L. E. W., 828 (Z.)
 Beveridge, G. E. G., 586 (R.F.)
 Beyers, C. F., 37 5 (Misc.)

- Bezançon, F. & Bernard, E., 617 (Am.)
 Bezsonova, A., Semikoz, T. & Kotelnikov, G., 674 (Pl.)
 Bhattacharyya, A. K., 428 (K.A.)
 Bhattacharyya, P., 857 (K.A.)
 Bidault, R., with Worms, 479 (Oph.)
 Bieloousowa, A. J., 239 (Dys.)
 Biglieri, R., Villegas, C. & Oyarzabal, J., 192 (Rab.)
 Billimoria, H. S. with Sokhey, Gokhale & Malandkar, 688 (Sp.)
 Bird, W., with Sinton & Eate, 140 (Mal.)
 Bishop, A., 255 (Z.)
 Bishopp, F. C., with Parman, Laake, Cook & Roark, 827 (Z.)
 Bjerlow, H. & Liljestrand, G., 94 (R.F.)
 Black, E. H., (313) (Chl.)
 Blacklock, D. B. & Gordon, R. M., 252 (Z.)
 —, Macdonald, G., 901 (Bl.)
 Blanc, G., & Caminopetros, J., 73 (K.A.), 630 (Dys.)
 Bligh-Peacock, N., 447 (Hel.)
 Blondin, 13 (Y. & S.)
 —, Wilbert, R. Delorme, M., 189 (Rab.)
 Bloom, C. J., 880 (Pel.)
 Bloomfield, A. L. & Wyckoff, H. A., 691 (Sp.)
 Bogojawlensky, N. A. & Demidowa, A. J., 937 (Hel.)
 Boinet & Pieri, J., 532 (Fev.)
 Boletín del Instituto de Clínica Quirúrgica, Buenos Aires, 61 (K.A.), 117 (Mal.)
 Bombay, 297, 298 (Lab.)
 van Bommel, L. B., 35 (Der.)
 Boncinelli, U., 519 (Und.)
 Bonnel, F., 247 (Dys.)
 Bonnin, H., 944 (Hel.)
 Borchardt, W., with Mayer & Kikuth, 254 (Z.)
 Borel, M., 120 (Mal.), 820, 834 (Z.)
 —, & Le-van-An, 554 (Mal.)
 Bose, A. N., Dastidar, S. K. G. & Bagchi, B. N., 857 (K.A.)
 Bose, J. P., (927) (Misc.)
 Bose, K., 571 (Mal.)
 Boudreau, 548 (Y.F.)
 Bouffard, 18 (C Bu.), (500) (Misc.), 660 (Y. & S.)
 Boulkine, A. K., 139 (Mal.)
 Bourova, L. F., 261 (Z.)
 Boyce, N., with Garcia, O. & C., & Broun, 23 (Myc.)
 Boyd, J. E. M., 913 (Misc.)
 Boyd, M. F. & Foot, H., 811 (Z.)
 Boyd, T. C. & Roy, A. C., 642 (Lep.)
 Bradfield, E. W. C. & Vasudevan, A., 694 (Der.)
 Bragina, A., 272 (Z.)
 Brahmachari, B. B., 305 *bis*, 306 (Chl.)
 Brahmachari, N. & Thakur, H. L. S. L., 435 (Bb.)
 Brahmachari, U., 928 (B.R.)
 — & Banerjee, S. C., 860 (K.A.)
 — & Dutt, A. M., 71 (K.A.)
 — & Sen, P. B., 500 (Misc.)
 Brandwijk, M. G., with Watt, 412 (Misc.)
 Braun, H. & Goldschmidt, R., 488 (Misc.)
 Brauner, with Combiesco, 239 (Dys.)
 Bray, G. W., 869 (Bb.)
 Bray, W. E., with Mulholland 610 (Jaun.)
 Brazil, V. & Vellard, J., 731 (Z.)
 Brenn, H., with Woskressenski, 572 (Mal.)
 Brighenti, D., with Ottolenghi, Brotzu, La Face & Robuschi, 123 (Mal.)
 Brill, 110 (Jaun.)
 British Empire Leprosy Relief Association: Leprosy Notes, 1003 (B.R.)
 British Guiana Medical Annual 1925, 636 (Lep.)
 British Medical Journal, 504 (Und.)
 Brochard, V., 3 (Y. & S.)
 Brocq-Rousseu, Guilliermond & des Cilleuls, 21 (Myc.)
 Bronfenbrenner, J. J., 929 (B.R.)
 Brosch, J., 714 (Rab.)
 Brosius, O. T., (500) (Misc.), 861 (K.A.)
 —, Peon, I. E. & Carrol, R. L., 969 (Hel.)
 Brotzu, G., with Ottolenghi, La Face, Brighenti, & Robuschi, 123 (Mal.)
 Broughton-Alcock, W., 914 (Misc.)
 Broun, G. O., with Garcia, O. & C., & Boyce 23 (Myc.)
 Brown, F. V. B. & Pullon, E. D., 129 (Mal.)
 Brown, H. C., 608 (Jaun.)
 — & Davis, L. J., 106 (Jaun.)
 —, with Henry, 635 (Dys.)
 Brown, H. W., 464 *bis*, 958 (Hel.)
 — & Cort, W. W., 464 (Hel.)
 Browne, D. C., 690 (Sp.)
 Browning, C. H., Cohen, J. B., Gulbransen, R., Phillis, E. & Snodgrass, W. R., 94 (R.F.)
 — & Gulbransen, R., 343 (S.S.)
 Bruchmann, C. A. & Ståbile de Nucci, L., 245 (Dys.)
 Brug, S. L., 246 (Dys.), 471 (Hel.), 549 (Y.F.)
 — & van Slooten, J., 278 (Z.)
 — & Walch, E. W., 126 (Mal.)
 Brumpt, E., 91 (R.F.), 216 (Am.), 914 (Misc.), 944 (Hel.)
 — & Werblunsky, S., 458, 945 (Hel.)
 Brnu, G., with Burnet & Caillon, 953 (Hel.)
 Brunner, M., 936 (Hell)
 Brussin, A. M. & Rogowa, G. J., 589 (R.F.)
 — & Schapiro, S. L., 590 (R.F.)
 Bruynoghe, R., 595 (R.F.)
 — & Cornil, J., 544 (Y.F.)
 — & Dubois, A., 93 (R.F.), 796 (S.S.)
 Buchanan, G. S., 845 (Y.F.)
 Buchmann, M., 224 (Am.)
 Büchner, S., 625 (Dys.)
 Buddle, R., (313) (Chl.)
 de Buen, S., 88 (R.F.)
 Buice, W. A., 558 (Mal.)
 Bulletin of the Antivenin Institute of America, Philadelphia, 290, 729, 730 (Z.)
 Bulletin Office International d'Hygiène Publique, 843 (Y.F.)
 Bulletin de la Société de Pathologie Exotique, 547 (Y.F.)
 Burke, A. M. B., with Lambert, 948 (Hel.)
 Burke, E., 893 (Bl.)
 Burnet, 516 (Und.)
 Burnet, E., 713 (Rab.)
 —, Caillon, L. & Brun, G., 953 (Hel.)
 — & Olmer, D., 530 (Fev.)
 Butjagina, A. P., with Lisgunova, 406 (Misc.)
 Butler, C. S. & Peterson, E., 1 (Y. & S.), 125 (Mal.)
 Butler, G. G., 295 (Lab.)

C

- Cabarrou, F. C., with Davis & Laino, 125 (Mal.)
 Cade, Morenas & Jeannin, 939 (Hel.)
 Caffrey, P. J., 931 (Hel.)
 Caillon, L., with Burnet, & Brun, 953 (Hel.)
 Caius, J. F., Kamat, S. A. & Naidu, B. P. B., 319 (Pl.)
 — & Mhaskar, K. S., 410 (Misc.)
 Calcutta, 366 (Misc.), 755 (B.R.)
 Caldwell, F. C., 450 (Hel.)
 — & Caldwell, E. L., 959 (Hel.)
 Callender, G. R., 183 (Hist.)
 Cameron, W. M., 463 (Hel.)
 Caminopetros, J., with Blanc, 73 (K.A.), 630 (Dys.)
 Campbell, G. J. & Patel, G. P., 404 (Misc.)
 Campbell, M. F., 669, 670 (G.V.)
 van Campenhout, J., 846 (Y.F.)
 Camplani, M., (989) (Lep.)
 Campos, E. de S., 356, 802 (S.S.)
 — & de Almeida, F. P., 745 (Myc.)
 Canciulesco, M., Herman, L. & Hirsch, R., 558 (Mal.)
 Canis, J., 479 (Oph.)
 Cannell, D. E., 855 (Y.F.)
 Cannon, P. R., Taliaferro, W. H. & Dragstedt, L. R., 836 (Z.)
 Čapek, A., 257 (Z.)
 Capistrano Pereira, S., (635) (Dys.)
 de Capua, F., (973) (Hel.)
 Cardamatis, G. P., 137, 154 (Mal.)
 Carman, J. A., 318 (Pl.)
 —, with Daubney, 932 (Hel.)
 Carmichael, E. B., 291 (Z.)
 Caro, J., 473 (Hel.)
 —, with Marchoux, 978 (Lep.)
 Carozzi, L., 968 (Hel.)
 Carpenter, C. M. & Baker, D. W., 50 (Und.)
 — & Parshall, C. J., 49 (Und.)
 Carpenter, G. D. H., 332 (S.S.), 891 (Bl.)
 Carpi, U., 110 (Jaun.)
 Carr, H. P. & Clarke, J. L., 124 (Mal.)
 Carrel, A., 929 (B.R.)
 Carrieu, M. & Rambault-Simon, 724 (Z.)
 Carrión, A. L., 829 (Z.)
 Carrol, R. L., with Brosius & Peon, 969 (Hel.)
 Carter, H. F., 80 (B.R.)
 — with Newstead, 804 (Z.)
 de Carvalho, O., 963 (Hel.)
 Casas, U., (973) (Hel.)
 Casazza, R., 705 (Der.)
 Cash, J. R. & Hu, C. H., 71 (K.A.)
 —, with Hu, 70 (K.A.)
 Castagna, P., (579) (Mal.)
 Castellani, A., 28 (Der.), 230 *bis*, 236 (Dys.), 742 (Myc.)
 Castellano, T. & Orgaz, J., 957 (Hel.)
 Castelli, A., with Petagnani, 275 (Z.)
 Casteran, R., with Fiessinger, 618 (Am.)
 Castex, M. R., González, H. & Poletti, R. A., 892 (Bl.)
 Castiglioni, A., 154 (Mal.)
 de Castro, A. B., 1000 (Misc.)
 — & Deuskar, V. N., 631 (Dys.)
 de Castro, A. M., 742 (Myc.)
 Castronuovo, G., 533 (Fev.)
 Catanei, A., with Montpellier, 24 (Myc.), 692, 695 (Der.)
 —, with — & Clapier, 30 (Der.)
 —, with — & Colonieu, 392 (Misc.), 740 (Myc.)
 Catanei, A., with Sergent, Ed. & Et. 727 (Z.)
 —, with — & Sénevet, 552 (Mal.)
 Cauchemez, 955 (Hel.)
 Cawston, F. G., 528, (535) (Fev.), 736 (Z.), 913 (Misc.), 942, 943 *ter* (Hel.)
 Cazanove, F., with Mathis & Bacqué, 545 (Y.F.)
 Cazenavette, L. L., 203 (Lep.)
 Celidonio, C., 741 (Myc.)
 Cerruti, C., 47, 48 (Und.)
 — & Reitani, V., 110 (Jaun.)
 Cerruti, C. F., 518 (Und.)
 Césari, E., 505 (Und.)
 Ceylon, 570 (Mal.)
 Chacin Itriago, L. G., 672 (Pl.), 831 (Z.)
 — & Bello, C. J., 831 (Z.)
 Chagas, C., 789 (S.S.)
 Chagas, E., 789 *ter* (S.S.)
 Chalam, B. S., 918 (Misc.)
 Champagne, R., with Sénevet, 940 (Hel.)
 Chan, Y. P. & Oldt, F., 478 (Oph.)
 Chang, H. L., with Meleney & Lee, 268 (Z.)
 Chandler, A. C., 932 (Hel.)
 Chao, H. A., 240 (Dys.)
 Chapman, L. S., 432 (Bb.)
 Charrier, H., 281 (Z.)
 Chatterjee, B. K., 634 (Dys.)
 Chatterjee, K. N., 426 (K.A.)
 Chatterjee, N., (579) (Mal.)
 Chatterjee, R. P., 63 (K.A.)
 Chatterji, S. P., with Muir, 649 (Lep.)
 Chaudhuri, S. G., with Chopra, 857 (K.A.)
 Chell, G. R. H., 890 (Bl.)
 Cherefeddin, 133 (Mal.)
 Cherefeddin, O., 621 (Am.)
 Chesterman, C. C., 10 (Y. & S.)
 — & Todd, K. W., 342 (S.S.), 659 (Y. & S.)
 Chevallier, P., with Emile-Weil & Flandrin, 164 (Myc.)
 — & Lévy, G., 803 (S.S.)
 Chodukin, N. I., (292), 821, 726 (Z.)
 — & Schewtschenko, F. I., 76 (K.A.)
 Chodukin, N. J. & Lisowa, A. I., 128 (Mal.)
 Choksy, N. H., (321) (Pl.)
 Chopra, R.N., 412 (Misc.)
 —, with Acton, 435 (Bb.)
 — & Chaudhuri, S. G., 857 (K.A.)
 — & David, J. C., 415 (Misc.)
 — & Gupta, C. R. D., 423 (K.A.)
 — Gupta, J. C., & Basu, N.K., 68, 420 (K.A.)
 — with —, & David, J. C., 67 (K.A.)
 —, —, —, & Ghosh, S., 411 (Misc.)
 —, —, —, Mullick, M. N. & Gupta, A.K.D., 858 (K.A.)
 Choremis, K., with Tsakalotos, 562 (Mal.)
 Chorine, V., 266 (Z.)
 Chowdhury, K. L., with Strickland, 237 (Z.)
 Christophers, S. R., Sinton, J. A. & Covell, G., 267 (Z.)
 Christopherson, J. B., 694 (Der.), 943 (Hel.)
 Chueca, F., 615 (Am.)
 Ciavaldini, J., 162 (Bl.)

- Ciclescu-Mavromati, M., 939, 940 (Hel.)
 Cieufuegos, J. M. A., with Legendre, 144 (Mal.)
 Cilento, R. W., 97 (Fev.), 290 (Z.), 941 (Hel.)
 Clapier, P., with Montpellier & Catanei, 30 (Der.)
 Clark, C. P., 990 (Oph.)
 Clark, F., 60 (K.A.)
 Clark, O. (157), (Mal.)
 Clark, T., 285 (Z.), 514 (Und.), 975 (Lep.)
 Clarke, J. L. with Carr, 124 (Mal.)
 Clearkin, P. A., 561 (Mal.)
 Cleland, J. B., 32 (Der.)
 Clerc, with Ledoux & Archer, 512 (Und.)
 Cleveland, L. R., 835 (Z.), 922 (Misc.)
 Clevers, M., 372 (Misc.)
 —, with Van den Branden & Moreels, 341 (S.S.)
 Cluver, E., 194 (Rab.), 963 (Hel.)
 Cobb, W. G., 788 (S.S.)
 Cochrane, R. G., 208, 638 (Lep.)
 Codvelle, Grandclaude & Vanlande, 941 (Hel.)
 —, with Pilod & Hugonot, 453 (Hel.)
 Crenaeus, J., 486 (Misc.)
 Cohen, with Gougerot, (500) (Misc.)
 Cohen, J. B., with Browning, Gulbransen, Phillis & Snodgrass, 94 (R.F.)
 Colas-Belcour, J., (599) (R.F.)
 —, with Nicolle & Anderson, 89 *bis* (599) (R.F.)
 Cole, J. C., 215 (Am.)
 Coleman, R. B., 457 (Hel.)
 Colonieu, L., with Montpellier, 392 (Misc.)
 —, with — & Catanci, 392 (Misc.), 740 (Myc.)
 Combiesco, D. & Brauner, 239 (Dys.)
 Comer, M. C., 282 (Z.)
 Comyn, K. (157), (Mal.)
 Connal, A., 162 (Bl.) 294 (Lab.)
 — & Paisley, J. C. 672 (Pl.)
 Connal, S. L. M. S., 274 (Z.)
 Connell, W. K., 336 (S.S.), 384 (Misc.)
 Conquest, C. N., with Wats & Loganadan, 631 (Dys.)
 Coogler, C. P., 128 (Mal.)
 Cook, F. C., with Parman, Bishopp, Laake & Roark, 827 (Z.)
 Cooke, F. H., 976 (Lep.)
 Cooke, W. E., 688 (Sp.), 997 (Misc.)
 —, with Low, 59 (Sp.)
 Cool, P., 470 (Hel.)
 Coonoor, Southern India, 193 (Rab.)
 Cooper, G. F., 923 (Misc.)
 Cordes, W., 1 (Y. & S.), 566 (Mal.)
 Cordier, G., 353 (S.S.)
 Cornil, J., with Bruynoghe, 544 (Y.F.) (Misc.)
 Cornwell, M. A., with Nye & Zervas, 998 (Misc.)
 Coro, A. J., (500) (Misc.)
 Corson, J. F., 294 (Lab.), 658, 842 (Y. & S.), 788 (S.S.)
 Cort, W. W., 946 (Hel.)
 —, with Brown, 464 (Hel.)
 da Costa, P., 2 (Y. & S.)
 da Costa, S. F. G., (973) (Hel.)
 —, with Rebello & Rico, 464, 938 *bis*, (974) *ter* (Hel.)
 Coutelen, F., 463, 973 (Hel.)
 Covell, G., 267, 818, 820 (Z.)
 — & Bally, J. D., 127 (Mal.)
 Covell, with Barraud, 814 (Z.)
 —, with Christophers & Sinton, 267 (Z.)
 —, with Sinton, 271 (Z.)
 Coventry, F. A. & Taliaferro, W. H., 937 (Hel.)
 Cowdry, E. V., 929 (B.R.)
 —, with Anderson, 728 (Z.)
 Cox, W. C. & Jacob, J. E., 496 (Misc.)
 Craig, C. F., 228, 623 (Am.)
 Craighead, A. C. & Das, S., 822 (Z.)
 Cram, E. B., 953 (Hel.)
 Crawford, T. S. B., 119 (Mal.)
 Crawford, V. J., 553 (Mal.)
 Croste, R., 940 (Hel.)
 Crutchfield, E. D., 881 (Pel.)
 Cruz, M. C., 650, 985 (Lep.)
 —, Lara, C. B. & Paras, E. M., 979 (Lep.)
 Cruz, Jr., O., with de Faria, 355 (S.S.)
 da Cunha, A. M., 718 (Z.)
 — & Muniz, J., 54, 523 (Fev.), 264 *bis*, 725 *bis* (Z.)
 Cunningham, J., Nicholas, M. J. & Lahiri, B. N., 190 (Rab.)
 Curry, D. P., 817 (Z.)
 Cushing, E. H., 110 (Jaun.)
 van Cutsem-Franco, A., 621 (Am.)
- D**
- Dahlmann, F., 33 (Der.)
 Dalal, P. A. & Madon, E. E., 918 (Misc.)
 Dallas, E. D., 287 (Z.)
 Damboviceanu, A., with Ionesco-Mihaesti, 627 (Dys.)
 Dang-Huu-Chi, with Dorolle, 130 *bis* (Mal.)
 Darker, G. F., 139 (Mal.), 139 (Jaun.)
 Das, S., with Craighead, 882 (Z.)
 —, with Shortt & Lal, 419 (K.A.)
 Dastidar, S. K. G., with Bose & Bagchi, 857 (K.A.)
 Daubney, R. & Carman, J. A., 932 (Hel.)
 Davenport, R. C., 480 (Hel.)
 Davey, J. B., 620 (Am.)
 David, 794 (S.S.)
 David, J. C., with Chopra, 415 (Misc.)
 —, with — & Gupta, 67 (K.A.)
 —, with —, — & Ghosh, 411 (Misc.)
 Davis, L. J., with Brown, 106 (Jaun.)
 Davis, N. C., 819 (Z.), 971 (Hel.)
 —, Cabarrou, F. C. & Laino, F., 125 (Mal.)
 — & Shannon, R. C., 819 (Z.)
 —, with —, 817 (Z.)
 —, with — & del Ponte, 816 (Z.)
 Dawson, A. S., 673 (Pl.), 677 (Chl.)
 De, P., with Dixon, (500) (Misc.)
 Debré, R., Marie, J. & Giroud, P., 509 (Und.)
 Dedichen, H. H., 998 (Misc.)
 De la Barrera, J. M. & Riva, A., 450 (Hel.)
 Delamare, G. & Gatti, C., 697 (Der.)
 Delanoë, E., 647 (Lep.), 992 (Oph.)
 Delanoë, P., 401 (Misc.)
 Delbet, P., 19 (C.Bu.)
 Del Negro, C., 277 (Z.)
 Delorme, M., with Blondin & Wilbert, 189 (Rab.)
 —, with Levaditii, 350, 797 (S.S.)
 —, with Troisier, Deschiens & Limousin, 963 (Hel.)
 —, with Wilburt, 102, 611 (Jaun.)

Del Ponte, E., with Shannon, 125 (Mal.)
 Demidowa, A. J., with Bogojawlensky, 937 (Hel.)
 Denney, O. E., 179 (Hist.), 637 (Lep.)
 — & Wooley, J. C., 641 (Lep.)
 Denny, C. R. & Nicholls, L., 382 (Misc.)
 Denton, J., 887 (Pel.)
 Deschiens, R., Limousin, H. & Troisic, J., 265 (Z.)
 —, with Troisier, Limousin & Delorme, 983 (Hel.)
 Des Cilleuls, L., with Brocq-Rousseu & Guilliermond, 21 (Myc.)
 Des Ligneris, M., 692 (Der.)
 Despontin, A. E., 192 (Rab.)
 Destefano, F. & Vaccarezza, R. F., 667 (C.Bu.)
 Deuskar, V. N., 608 (Jaun.)
 —, with de Castro, 631 (Dys.)
 Deutsch, D., 615 (Am.)
 Dévé, F., 462, 955, 956 *bis* (973) (Hel.)
 — & Lacroix, A., 956 (Hel.)
 — & Rolland, P., 956 (Hel.)
 Devezé, P., with Margat, 982 (Lep.)
 Dew, H. R., 955 (Hel.)
 Diamantis, 944 (Hel.)
 Dickie, W. M., 314 (Pl.)
 Dietel, F., 43 (Und.)
 Dikmans, G., 450 (Hel.)
 Dimitrieva, M. A., with Kopp & Zwetkova-Pirogovskaja, 934 (Hel.)
 Dinānah, T., 177 (Hist.)
 Dixon, W. E. & De, P., (500) (Misc.)
 Dobell, C., 227 (Am.)
 Dodd, K. & Wilkinson, S. J., 322 (H S.)
 Donatien, A., with Parrot, 75 (K.A.)
 —, with — & Lestoquard, 427 (K A.)
 Donnison, C. P., 394 (Misc.)
 Doorenbos, W., 315 (Pl.)
 Dopter, (635) (Dys.)
 Doré, G. R., 157 (Mal.), 399 (Misc.)
 Dorolle, P., 554 (Mal.)
 — & Dang-Huu-Chi, 130 *bis* (Mal.)
 Dos Santos, I. F., with de Almeida, 746 (Myc.)
 Dostrowsky, A., (78) (K.A.)
 Doubrovinsky, S. B., Kranzfeld, A. M., Rosenfeld, V. D. & Salamandra, E. G., 934 (Hel.)
 Doubrow, with Garin & Mounier, 936, 966, 970 *bis* (Hel.)
 Dove, W. E., with White, 34, 701 (Der.)
 Dragstedt, L., with Cannon & Taliaferro, 836 (Z.)
 van Driel, B. M., 482 (Oph.), 535 (Fev.), 655 (Y. & S.)
 Duarte, J. G., 25 (Myc.)
 Dubois, A., with Bruynoghe, 93 (R.F.), 796 (S.S.)
 Ducros, with Girard, 987 (Lep.)
 Duff, D., 666 (C.Bu.)
 Duggan, J. N., 481 (Hel.), 990 (Oph.)
 Duke, H. L., 759, 785 (S.S.), 905 (Lab.)
 — & van Hoof, L., 776 (S.S.)
 —, with Kleine & van Hoof, 781 (S.S.)
 Dunham, G. C., 912 (Misc.)
 Dunn, L. H., 273 *ter*, 288, 808 (Z.)
 Dunn, T. B., 214 (Am.)
 Dunning, F. & Macht, D. I., 347 (S.S.)
 Dupont, 844 (Y.F.)
 Durand, P. & Lumbroso, U., 475 (Oph.)

Durante, G., 739 (Myc.)
 Dürck, H., 562 (Mal.)
 Durieux, C., with Mathis & Ewstifeief, 87 (R.F.)
 Dusseldorp, M., 479 (Oph.)
 Duthu, L., with Espié, 964 (Hel.)
 Dutt, A. M., with Brahmachari, 71 (K.A.)
 Dutta, J. C., 961 (Hel.)
 Duwez, J., with Houssian, 222 (Am.)
 Duyck, 393 (Misc.)
 Dyar, H. G. & Núñez Tovar, M., 266 (Z.)
 Dye, W. H., 331 (S.S.)

E

Eate, S. N., with Sinton & Bird, 140 (Mal.)
 Ebert, M. K., 160, 900 (Bl.)
 Edington, A. D., 54 (Fev.)
 Edwards, F. W., 819 (Z.)
 — & Given, D. H. C., 809 (Z.)
 Eggleston, C., with Hunt, McCann, Rowntree & Voegtlin, 500 (Misc.)
 Ehara, I., 983 (Lep.)
 Elbert, B., Jowelew, B. & Ssutin, J., 196 (Rab.)
 Elschmig, A., 993 (Oph.)
 Elvehjem, C. A., & Waddell, J., 498 (Misc.)
 Emile-Weil, P., 749 (Myc.)
 —, Chevallier, P. & Flandrin, P., 164 (Myc.)
 — & Grégoire, R., 399 (Misc.)
 —, — & Flandrin, 163, 164 (Myc.)
 —, with — & —, 163 (Myc.)
 Engelhardt, W. E. & Ray, J. C., 311 (Chl.)
 Enrico, C., 46 (Und.)
 Enzer, A. J., 782 (S.S.), 972 (Hel.)
 Erber, M., 470 (Hel.)
 Escalar, G., 156 (Mal.)
 —, with Pecori, 156 (Mal.)
 Escomel, F., 36 (Der.), 258 (Z.)
 Espié, A., 932 (Hel.)
 — & Duthu, L., 964 (Hel.)
 Esposito, A., 41 (Und.)
 Esquier, C. A., 599 (R.F.)
 Essex, H. E., 460 (Hel.)
 Eubanas, F., 649 (Lep.)
 —, with Lara & de Vera, 983 (Lep.)
 — & de Vera, B., 206 (Lep.)
 Evans, A. M., 80 (B.R.), 817 (Z.)
 Evans, E. W., with Severn, 625 (Dys.)
 Ewing, H. E., 804 (Z.), 993 (Oph.)
 Ewstifeief, C., with Mathis & Durieux, 87 (R.F.)
 Eysell, A., (737) (Z.)

F

Fabre, H., 569 (Mal.)
 Fabris, S., 421 (K.A.)
 Faderin, K., 243 (Dys.)
 Fairbairn, H., 457 (Hel.)
 Fairbrother, R. W., 680 (Chl.)
 Fairley, N. H., 56 (Sp.), 944 (Hel.)
 — & Williams, F. E., 458 (Hel.)
 Falcão, E. de C., 283 (Z.)
 Falcão, T., (579) (Mal.)
 Falleroni, D., 123 (Mal.), 269 (Z.)
 Far Eastern Association of Tropical Medicine, 329 (B.R.)

- de Faria, G. & Cruz, Jr. O., 355 (S.S.)
 Farjot, A., with Melnotte, 100 (Jaun.)
 Farnam, W., with Foster, 218 (Am.)
 Faure-Beaulieu, M., 617 (Am.)
 Faust, E. C., 290, 716 (Z.), 941 (Hel.)
 Favilli, G., 518 (Und.)
 Favre, M., 19 (C.Bu.)
 —, with Tixier, Morenas & Petouraud, 217 (Am.)
 Feder, J. M., 216 (Am.)
 Federated Malay States, 119 (Mal.)
 — Ann. Rep. Inst. Med. Res., 300 (Lab.)
 Feiler, M., (927) (Misc.)
 Feldt, A., 649, 986 (Lep.)
 — & Schott, A., 405 (Misc.)
 Feliciano, R. T., with Vedder, 863 (Bb.)
 Fermi, C., 188, 711 (Rab.), 572, (579) (Mal.)
 Fernandes, E., with Rezende, 664 (Y. & S.)
 Fernández Martínez, F., 77, 426 (K.A.)
 — & García del Diestro, J., 77 (K.A.)
 Fernando, A. S., 484 (Oph.)
 Fernando, J. S., 308 (Chl.)
 Ferrán, J., (157) (Mal.)
 Ferreira, M. J., 882 (Pel.)
 Fialho, A., with Pinto & Barreto, 829 (Z.)
 Field, J. W., with Fletcher, 52 (Fev.)
 Fielding, J. W., 830 (Z.)
 Fiessinger, N. & Casteran, R., 618 (Am.)
 Filippi, J., with Pavlovsky & Mahieu, (973) (Hel.)
 Findlay, G. M., 884 (Pel.)
 Finzi, G., 195 (Rab.)
 Fischer, O., 335 (S.S.), 616 (Am.), 665 *bis* (C.Bu.)
 — & Weise, W., 135 (Mal.)
 Fisher, A. B., with Taliaferro, W. H., & Taliaferro, L., 149 (Mal.)
 Flandrin, P., with Emile-Weil & Chevallier, 164 (Myc.)
 —, with — & Grégoire, 163, 164 (Myc.)
 —, with Grégoire & Emile-Weil, 163 (Myc.)
 Fleming, W. D., 496 (Misc.)
 Fletcher, W., 300 (Lab.), 606 (Jaun.)
 — & Field, J. W., 52 (Fev.)
 — & Kanagarayer, K., 134 (Mal.)
 —, with Stanton, 382 (Misc.)
 —, with — & Symonds, 382 (Misc.)
 Florentin, P., with Spillmann & Kissel, 981 (Lep.)
 Foá, R., 992 (Oph.)
 Fonseca, A., 957 (Hel.)
 da Fonseca, O., 10 (Y. & S.), 260 (Z.), 549 (Y.F.)
 — & Leão, A. E. de A., 31, 693, 696 *bis* (Der.), 25, 741, 743 *quat.*, 744, 745 (Myc.)
 —, — & Penido, J. C., 695 *bis* (Der.)
 Fontanel, J. P. J. & Melnotte, P. E. M., 222 (Am.)
 Foot, H., with Boyd, 811 (Z.)
 Forster, W. H. C., 317 (Pl.)
 Forté, E., with Mazza, Alvarez Soto & Arias Aranda, 133 (Mal.)
 Fortier, L. A. & Gately, T. T., 958 (Hel.)
 Fortuyn, A. B. D., 254 (Z.)
 Foster, J. H., 497 (Misc.)
 —, & Farnam, W., 218 (Am.)
 —, with Zia, (501) (Misc.)
 Fourche, J. A., 342 (S.S.)
 Fourquier, G., with Grasset, 618 (Am.)
 Fowler, H. P., 219 (Am.)
 Fowler, J. K., 112, 850 (Y.F.)
 Fox, F. W., 246 (Dys.)
 França, 456 (Hel.)
 Franchini, G., 123 (Mal.), 726 (Z.)
 Francis, E., 253 (Z.)
 Frantzen, W., 829 (Z.)
 Fraser, N.D., 228 (Am.)
 Frasey, V., with Pettit & Stefanopoulo, 851 (Y.F.)
 Frei, W., 19, 666 (C.Bu.)
 — & Hoffmann, H., 18 (C.Bu.)
 Freire Muñoz, C., 194 (Rab.)
 Frendo, G. A., 636 (Lep.)
 Friede, K.A., with Kritschewski, 598 (R F)
 Friedenreich, V., 679 (Chl.)
 Fuchs, E., 992 (Oph.)
 Fujimori, K., 679 (Chl.)
 Fukushima, B. & Hosoya, S., 106 (Jaun.)
 Furutama, T., with Morishita, 146 (Mal.)
 —, with — & Namikawa, 146 (Mal.)
- G**
- Gage, A., 38 (Der.), 381 (Misc.)
 Galal Aboul Seoud, 479 *bis* (Oph.)
 Galbreath, W. R. & Weiss, C., 747 (Myc.)
 Gallais, G., (157) (Mal.)
 Galliard, H., 810 (Z.)
 — & Robles, R., 524 (Fev.)
 Galli-Valerio, B., 710 (Rab.)
 Gammel, J. A., 29 (Der.)
 Gamma, C., 751 (Myc.)
 Garcia, O., Garcia, C. Boyce, N. & Broun, G. O., 23 (Myc.)
 Garcia del Diestro, J., with Fernández Martínez, 77 (K.A.)
 Garcia de San Martin, H., with Varela & Rubino, 724 (Z.)
 Garcin, R., with Loeper, 957 (Hel.)
 Garin, C., Doubrow, S. & Mounier, H., 936, 966, 970 *bis* (Hel.)
 Garnham, P. C. C., 830, 834 (Z.)
 Garrison, C. W., 882 (Pel.)
 Garrone, E., (973) (Hel.)
 Garzon, R., 33 (Der.)
 Gasasianz, A. A., 578 (Mal.)
 Gately, T. T., with Fortier, 958 (Hel.)
 Gatti, C., with Delamare, 697 (Der.)
 Gaujoux, E. & Stodel, G., 599 (R.F.)
 Gay, D. M. & Sellards, A. W., 104 (Jaun.)
 Gehrcke, A., 215 *bis* (Am.)
 Gelonesi, G., 31, 700 (Der.)
 Geneeskundig Tijdschrift voor Nederland-sch-Indië, 301, 302 (Lab.)
 Gerlach, F., 187 (Rab.)
 Gerschenowitsch, R. S., 422 (K.A.)
 Ghercovic, I., with Ballif, 445 (Pel.)
 Ghosh, S., with Chopra, Gupta & David, 411 (Misc.)
 Giacardy, 976 *bis* (Lep.)
 Gibson, E., 15, 669 (G.V.)
 Giemsa, G. & Mayeda, S., 346 (S.S.)
 Giglioli, G., 467 (Hel.)
 Gilbert, M. J., with Rosenholz, 86 (R.F.)
 Gilbert-Dreyfus, with Bernard, 101 (Jaun.)
 Gilks, J. L., 857 (K.A.)
 Gill, C. A., 126 (Mal.), 753 (B.R.), 969 (Hel.)
 Gillespie, E. B., with Hahn, 387 (Misc.)
 Gillet, with Lomry, 491 (Misc.)

- Girard, G., 317, 676 (Pl.)
 — & Ducros, 987 (Lep.)
 — & Robic, J., 650 (Lep.)
 Giroud, P., with Debré & Marie, 509 (Und.)
 Gittings, J. C. & Waltz, A. D., 257 (Z.)
 Given, D. H. C., 911 (Misc.)
 —, with Edwards, 809 (Z.)
 Gladin, 832 (Z.)
 Glaser, R. W., 929 (B.R.)
 Glasunov, M., with Smirnov, 959 (Hel.)
 Gloster, T. H., 193 (Rab.)
 Glover, W. E., 219 (Am.)
 Glusmann, M., 709 (Rab.)
 —, Kowalewa, O. & Predtetschenskaja, L., 711 (Rab.)
 — & Schmidt-Weyland, P., 711 (Rab.)
 — & Solowjowa, J., 710 (Rab.)
 Gnanadikam, G. J., 481 (Hel.)
 Godinez Gutierrez, J., (635) (Dys.)
 Godoy, A. & Lacorte, J. G., 728 (Z.)
 Gokhale, S. K., with Sokhey, Malandkar & Billimoria, 688 (Sp.)
 Goldberger, J., 880 (Pel.)
 — & Sydenstricker, E., 439 (Pel.)
 — & Wheeler, G. A., 444, 445 (Pel.)
 —, —, Lillie, R. D. & Rogers, L. M., 886 bis (Pel.)
 Goldschmidt, R., with Braun, 488 (Misc.)
 Goldsworthy, N. E., 954 (Hel.)
 Gomes, J. M., 641 (Lep.)
 —, Leitão, C. A. P. & Wancolle, A., 643 (Lep.)
 González, H., with Castex & Poletti, 892 (Bl.)
 González-Martínez, I., 948 (Hel.)
 Gonzalez Olachea, M., 157 (Mal.)
 Goodpasture, E. W., 929 (B.R.)
 Gordon, G. A. C., 924 (Misc.)
 Gordon, R. M., with Blacklock, 252 (Z.)
 Gori, P., 588 (R.F.)
 Gosset, A., Bertrand, I. & Magrou, J., 751 (Myc.)
 Gougerot, 578 (Mal.)
 —, Bertillon & Roques, A., 670 (G.V.)
 Gougerot, H., 641 (Lep.)
 — & Cohen, (500) (Misc.)
 Gough, I. H., 288 (Z.)
 Gourvitch, I., 614 (Am.)
 Gouzien, P., 111 (Y.F.)
 Grace, A. W., 405 (Misc.)
 Graf, H. & Müller, I., 418 (Misc.)
 Graham, G. S. & MacCarty, S. H., 388 (Misc.)
 Graham, J. D., 426 (K.A.), 433 (Bb.), 652 (Lep.)
 Graham, J. W., 658 (Y. & S.), (157) (Mal.)
 Grandclaude, with Codvelle & Vanlande, 941 (Hel.)
 Grassberger, A., (599) (R.F.)
 Grasset, E. & Fourquier, G., 618 (Am.)
 Gräub, E., 50 (Und.)
 Gravellat, 372 (Misc.)
 Gray, G. M., 416 (Misc.)
 Green, F. N., 253 (Z.), 709 (Rab.)
 Grégoire, R., with Emile-Weil, 399 (Misc.)
 —, — & Flandrin, P., 163 (Myc.)
 —, R., with — & —, 163, 164 (Myc.)
 Greval, S. D. S., 651 (Lep.)
 Grey, E. C., 865 (Bb.)
 Griffiths, T. H. D., 272, 277 (Z.)
 Gromier, E., 38 (Der.)
 Grubbs, S. B., (321) (Pl.)
 Gueidon, E. & Pons-Leychard, A., 73 (K.A.)
 Guelmino, D., 813 (Z.)
 Guerra, A. R., 692 (Der.)
 Guillermin, J., with Morin, 628 (Dys.)
 Guilliermond, with Brocq-Rousseau & des Cilleuls, 21 (Myc.)
 Guimaraes, F., 451 bis (Hel.)
 Gulbransen, R., with Browning, 343 (S.S.)
 —, with —, Cohen, Phillis & Snodgrass, 94 (R.F.)
 Gupta, A. K. D., 259 (Z.)
 —, with Chopra, Gupta J. C., & Mullick, 858 (K.A.)
 Gupta, B. M., with Sarcar, 437 (Bb.)
 Gupta, B. M. D., with Knowles, 725 (Z.)
 Gupta, C. C. D., (579) (Mal.)
 Gupta, C. R. D., with Chopra, 423 (K.A.)
 —, with Napier, 858 (K.A.)
 Gupta, J. C., with Chopra & Basu, 68, 420 (K.A.)
 —, with — & David, 67 (K.A.)
 —, with —, — & Ghosh, 411 (Misc.)
 —, with —, Mullick & Gupta, A.K.D., 858 (K.A.)
 —, with Megaw, 364 (Misc.)
 Gupta, N. R. S., 434 (Bb.)
 Guthrie, N., 462 (Hel.)
 Gutzevitch, A., with Magnitsky, 823 (Z.)
 Gwélesany, J., 92 (R.F.)

H

- Haberfeld, W., 620 (Am.)
 Habs, H., 513 (Und.)
 Hachiya, T. & Takahashi, M., 679 (Chl.)
 Hackett, L. W., with Missiroli, 122 (Mal.)
 Haddon, E. H., 517 (Und.)
 Hadfield, G., with White, 442 (Pel.)
 Hahn, E. V., 1001 (Misc.)
 — & Gillespie, E. B., 387 (Misc.)
 — & Hirsch, 310 (Chl.)
 Haim, with Much & Peemöller, 291 (Z.)
 Hakushi, R., with Koidzumi, 268 (Z.)
 Haldane, J. S., 889 (H.S.)
 Halder, K. C., with Napier, 62 (K.A.)
 Hall, E. R., 737 (Z.)
 Hall, I. C. & Whitehead, R. W., 409 (Misc.)
 Hall, W. W. & Wakefield, E. G., 322 (H.S.)
 —, with —, 322 (H.S.)
 Halloran, C. R., 694 (Der.)
 Hamburger, C., 994 (Oph.)
 Hamid, M., 961 (Hel.)
 Hamilton, G. R., 700 (Der.)
 Hamlyn-Harris, R., 805 (Z.)
 Hance, J. B., 242 (Dys.)
 Hanschell, H. M., 17 (C. Bu.), 550 (Mal.), 663 (Y. & S.)
 Hansen, I., 290 (Z.)
 Hardwicke, C., 972 (Hel.)
 Hardy, A. V., 503 (Und.)
 Harefuah, (247 sex) (Dys.)
 Harlé, G., 949 (Hel.)
 Harnett, W. J., 463 (Hel.)
 Harris, R. H. T. P., 828 (Z.)
 Harrold, C. C., 693 (Der.)
 Harston, G. M., 991 (Oph.)
 Hartman, E., 728 (Z.)
 den Hartog, B. J. C., 37 (Der.)
 Hasegawa, M., 3 (Y. & S.), 26 (Der.)

- Hashimoto, T., Ishibashi, T., Iwatake, H. & Ota, M., 28 (Der.)
 Hasson, J., with Little, 211 (Lep.)
 Hattori, R., 576 (Mal.)
 Hayashi, K. & Igari, D., 453 (Hel.)
 Hayes, T. H., 970 (Hel.)
 Hayne, T. B., with Barber & Komp, 124 (Mal.)
 Health Bulletin, No. 13, Malaria Bureau No. 5, (292) (Z.)
 Health, Melbourne, (684) (Chl.)
 Hees, H., 378 (Misc.)
 Hegner, R., 167 (B.R.), 254, 255, 260, 265, 718, 722, 723 (Z.)
 ——— & Manwell, R. D., 137 (Mal.)
 ——— & Ratcliffe, H., 258 (Z.)
 Hein, G. E., McCalla, R. L. & Thorne, G. W., 388 (Misc.)
 Heitzmann, O., 97 (Fev.)
 Hellerstroem, S., 666 (C.Bu.)
 Hempt, A., 712 (Rab.)
 Henderson, J. M., 981, 982 (Lep.)
 ———, with Muir, 653 (Lep.)
 ———, with ——— & Landeman, 210 (Lep.)
 Henderson, J. R., 831 (Z.)
 Hendrie, H. M., (14) (Y. & S.)
 Henriques, J. F., 561 (Mal.)
 Henry, E., with van den Branden, 133 (Mal.)
 Henry, T. A. & Brown, H. C., 635 (Dys.)
 Henry, X., 148 (Mal.)
 Hercelles, O., 53 bis, 527 (Fev.)
 d'Herelle, F. & Malone, R. H., 308 (Chl.)
 Herman, L., with Canciulesco & Hirsch, 558 (Mal.)
 Hermans, E. H., 175 (Hist.), 841 (B.R.)
 ———, with de Langen, 636 (Lep.)
 Hernández, L. G., with Otero, 979 (Lep.)
 Heronimus, E. S., 590 (R.F.)
 Herrick, C. A., 967 (Hel.)
 Herrmann, E., 107 (Jaun.)
 Herrmann, G. R., with Scott, 867 (Bb.)
 Herrmann, O., 714 (Rab.)
 ———, Kolossow, J. & Lipin, N., 919 (Misc.)
 Hertig, M., with Young, 64, 424 (K.A.)
 Herzberg, K., with Manteufel, 659 (Y. & S.)
 Hewetson, W. M., 570 (Mal.)
 Heydon, G. M., 453, 466 bis, 474 (Hel.)
 Hildebrand, S. F., 275 (Z.)
 Hill, C. M. & Hill, R. B., 244 (Dys.)
 Hill, R. B., 466 (Hel.)
 Hindle, E., 539 (Y. F.)
 ——— & Patton, W. S., 64 (K.A.)
 ———, with ———, 822 (Z.)
 ———, with Sellards, 539 (Y. F.)
 ——— & Thomson, J. G., 859 (K.A.)
 Hingston, H., (500) (Misc.)
 Hinman, E. H., with Matheson, 806 (Z.), 918 (Misc.)
 Hinshaw, H. C., (737) (Z.)
 Hiraishi, T., 465 (Hel.)
 Hirano, R. & Shiraogawa, H., 238 (Dys.)
 Hirasawa, I., 465 (Hel.)
 Hirsch, with Hahn, 310 (Chl.)
 Hirsch, R., with Canciulesco & Herman, 558 (Mal.)
 Hirst, L. F., (321) (Pl.)
 Hirst, S., 288 (Z.)
 Hitti, Y. K., with Lépine, 862 (K.A.)
 Hitzrot, L. H., 400 (Misc.)
 Hiyeda, G., 610 (Jaun.)
 Hoare, C. A., 264 (Z.)
 Hodara, M. & Behdjiet, H., 34 (Der.)
 Hodgson, E. C., Vardon, A. C. & Singh, Z., 413 (Misc.)
 Hodson, V. S., 224 (Am.)
 Hoffman, W. A., 459 (Hel.)
 ———, with Lambert, 948 (Hel.)
 Hoffmann, C. C., 812 (Z.)
 Hoffmann, H., with Frei, 18 (C. Bu.)
 Hoffmann, W. (889) (H.S.)
 Hoffmann, W. H., 104 (Jaun.) 416 (Misc.)
 543, 547, 549 bis (549 bis) 852, 853 (Y.F.), 644, (654 bis) (Lep.), 735 (Z.)
 Hofin, J. W., 119 (Mal.)
 Hofstötter, H. (474) (Hel.)
 Höglund, G., 89 (R.F.)
 Hogue, M. J., 257, 724 (Z.)
 Holliday, M., with Webb, 11 (Y. & S.)
 Hollmann, G. F., 482 (Oph.) 562 (Mal.)
 Holst, J. E., 57 (Sp.)
 Hone, F. S., 51 (Fev.)
 Honig, L., with Schöffner, Mochtar & Proehoeman, 544 (Y.F.)
 van Hoof, L., 775, 779, 780 ter (S.S.)
 ———, with Duke, 776 (S.S.)
 ———, with Kleine & Duke, 781 (S.S.)
 van Hoorde, 660 (Y. & S.)
 Hooton, A., 367 (Misc.)
 Horowitz, with Jeanselme & Huet, 862 (K.A.)
 Horwitz, P., 646 (Lep.)
 Hoshi, N., (635) (Dys.)
 Hosoya, S. with Fukushima, 106 (Jaun.)
 ———, with Sazerac & Stefanopoulo, 101 (Jaun.)
 ——— & Stefanopoulo, G. J., 608 (Jaun.)
 Hospital for Tropical Diseases, London, 757 (B.R.)
 Houdemer, E., with Joyeux, 460 (Hel.)
 Houssiau & Duwez, J., 222 (Am.)
 Howard, H. J., 477, 482 bis, 483 (Oph.)
 Hsu, K., 480 (Oph.)
 Hu, C. H. & Cash, J. R., 70 (K.A.)
 ———, with ———, 71 (K.A.)
 Huchard, G. L., 37 (Der.)
 Huddleson, I. F., with Orr, 515 (Und.)
 Hudicourt, L., 161 (Bl.)
 Hudson, N. P., 853 (Y.F.)
 ———, with Bauer, 848 (Y.F.)
 ———, with Stokes & Bauer, 537, 538 (Y.F.)
 Huet, L., with Jeanselme & Horowitz, 862 (K.A.)
 Huff, C. G., 262 (Z.)
 Hughes, T. A. & Shrivastava, D. L., 395, 415 (Misc.)
 Hugonot, with Pilod & Codvelle, 453 (Hel.)
 Huinink, A. S. T. B., with Schuurman, 919 (Misc.)
 Huizenga, L. S., (889) (H.S.)
 Hulshoff, A. A., with Olivier, 565 (Mal.)
 Hunt, R., McCann, W. S., Rowntree, L. G., Voegtlin, C. & Eggleston, C., (500) (Misc.)
 Huntsinger, F. O., 7 (Y. & S.)
 Huppenbauer, C. B., 925 (Misc.)
 Hutchinson, W. A., 16 (G.V.)
 Hutchison, H. S., 457 (Hel.) 614 (Am.)

I

- Iatzenko, T. I., 817 (Z.)
 Ibrahim, A., 397 (Misc.) 456 (Hel.)
 Ibrahim, F. G., 476 (Hel.)

Ichok, M. G., 187 (Rab.)
 Ievers, C. L., 389 (Misc.)
 Igari, D., with Hayashi, 453 (Hel.)
 Ignacio, M., with Sison, 496 (Misc.)
 Ignacio, P., with Vitug, 131 (Mal.)
 Ihara, Y., 641 (Lep.)
 Imura, (676) (Pl.)
 Iio, A., 960 (Hel.)
 Ikegami, Y., 7 (Y. & S.)
 Imig, F., 710 (Rab.)
 Inada, J., 105 (Jaun.)
 Indian Medical Gazette, 755 (B.R.)
 Infante, 794 (S.S.)
 Ingram, A., 831 (Z.)
 — & de Meillon, B., 815 (Z.)
 Inokuchi, K., 629 (Dys.)
 Inouyé, Z., 681 (Chl.)
 —, with Takano & Ohtsubo, (684) (Chl.)
 Ioff, I., 286 (Z.)
 Ionesco, D. & Valter, B., 191 (Rab.)
 Ionesco-Mihaiescu, C. & Damboviceanu, A., 627 (Dys.)
 Iramina, K., (157) (Mal.)
 Irfan, J., with Martini, Mahmud & Vogel, 810 (Z.)
 d'Irsay, S., 178 (Hist.)
 Isabolinsky, M. & Zettlin, A., 190 (Rab.)
 Ishibashi, T., with Hashimoto, Iwatake & Ota, 28 (Der.)
 Ishii, N., 941 (Hel.)
 Ishii, S., with Miyagawa, 195 (Rab.) 715 (Rab.)
 Ishikawa, S. & Nohira, A., 39 (Der.)
 Ito, K., 455 (Hel.)
 Itoh, T., with Murata & Ogawa, 698 (Der.)
 Iturbe, P. M., 209 (Lep.)
 Iwatake, H., with Hashimoto, Ishibashi & Ota, 28 (Der.)
 Izquierdo Salazar, A. D., (635) (Dys.)

J

Jacob, J. E., with Cox, 496 (Misc.)
 — & McLavy, J. R., 496 (Misc.)
 Jaffé, R. H. & Willis, D., 835 (Z.)
 Jahnel, F. & Lange, J., 7 (Y. & S.)
 — & Lucksch, F., 594 (R.F.)
 Jakoby, C., 223 (Am.)
 James, S. P., 115, 573 (Mal.) 846 (Y.F.)
 —, Nicol, W. D. & Shute, P. G., 573 (Mal.)
 James, W. M., 212 (Am.)
 Jameson, A. P., 263, 729 (Z.)
 Jantzen, W., 380 (Misc.) 875 (Bb.)
 Jaubert, A., with Lemierre & Marchal, 508 (Und.)
 Jeannin, with Morenas & Cade, 939 (Hel.)
 Jeansclme, E., 8 (Y. & S.) 976 (Lep.)
 —, Huet, L. & Horowitz, 862 (K.A.)
 Jessner, M., 74 (K.A.)
 v. Jettmar, H. M., 310 (Chl.) 320 (Pl.)
 Jo, M., 101 (Jaun.)
 Jobling, B., 825 (Z.)
 Johansen, F., 647 (Lep.)
 Johnson, W. B. & Rawson, P. H., 284 (Z.)
 Jolly, G., 905 (Lab.)
 Jones, A. E., 14 (Y. & S.)
 Jones, E. & Tirrill, Jr. W. O., 651 (Lep.)
 Jones, E. L., 24 (Myc.), 682 (Chl.)

Jonnesco, D., 191, 710 (Rab.)
 — & Valter, B., 191 (Rab.)
 —, — & Teodosiu, T., 191 (Rab.)
 Jorge, R., 285 (Z.)
 Journal of Laboratory & Clinical Medicine, 16 (G.V.)
 Jowelew, B., with Elbert & Ssutin, 196 (Rab.)
 Joyeux, C., 446 (474) (Hel.) 803 (S.S.)
 — & Baer, J. G., 460 (Hel.)
 — & Houdemer, E., 460 (Hel.)
 — & Kobozieff, N. I. (474) (Hel.)
 Jungeblut, C. W., 237 (Dys.) 405 (Misc.)
 Junior, V., 112, 853 (Y.F.)

K

Kadaner & Wallon, R., (362) (S.S.)
 Kalic, D., 229 (Dys.)
 Kallloch, D. C., 480 (Oph.)
 Kamat, S. A., with Caius & Naidu, 319 (Pl.)
 Kanagarayer, K., 96 (R.F.)
 —, with Fletcher, 134 (Mal.)
 Kanda, K. & Takizawa, T., 991 (Oph.)
 Kandiah, M., 132 (Mal.)
 Kandou, R., with Olivier, 454 (Hel.)
 Karamchandani, P. V., 74 (K.A.)
 Karapetian, E., 449 (Hel.)
 Karlowski, Z., (197) (Rab.)
 Karve, S. D., 130 (Mal.)
 Katagi, R., 736 (Z.)
 Katsurada, F., 433 (Bb.)
 — & Yoshino, J., 534 (Fev.)
 Katzenellenbogen, I., 996 (Misc.)
 Kauders, O., 152 (Mal.)
 Kauntze, W. H., 905 (Lab.)
 Kawamura, R., 52 (Fev.)
 Kawatani, S. & Okuwada, S., 190 (Rab.)
 Kayser, J. D., 202 (Lep.) 704 (Der.)
 Kedrowsky, W. J., 652 (Lep.)
 Keevill, A. J., 795 (S.S.)
 Kelsall, R., 287 (Z.)
 Kellaway, C. H., 953, 955 (Hel.)
 Kellersberger, E. R., 792 (S.S.)
 Kenny, D. M., 376 (Misc.)
 Kenya & East African Medical Journal, 451 (Hel.) (501 bis) (Misc.), 577 (Mal.) (644) (Y. & S.) (676) (Pl.)
 Kenya, Ann. Rep. Med. Res. Lab., 905 (Lab.)
 Kessel, J. F., 717 (Z.) (737) (Z.)
 Khalil, M., 446, 456, 945, 947 (Hel.)
 Khartoum, Kitchener School of Medicine, 1004 (B.R.)
 Khouri, J., 528 (Fev.)
 Kii, N., 193 (Rab.)
 Kikuth, W., 159 (Bl.)
 —, with Mayer, 521 (Fev.)
 —, with — & Borchardt, 254 (Z.)
 —, with Regendanz, 838 (Z.)
 — & Tropp, G., 577 (Mal.)
 Kimber, W. J. T., 442 (Pel.)
 King, C. H., with Barber, 805 (Z.)
 King, H. H., 288 (Z.) 904 (Lab.)
 Kingsbury, A. N., 193 (Rab.) 487 (Misc.)
 Kirby, Jr., H., 719 (Z.)
 Kirby-Smith, J. L., 697 (Der.)
 Kirkland, H. T., 945 (Hel.)
 Kirkpatrick, H., 475, 990 (Oph.)
 Kirschbaum, W., 151 (Mal.)

- Kirschner, L., 12 (Y. & S.)
 Kirstner, A. A., with Pantschenkow, 493 (Misc.)
 Kislitschenko, L. & Baranoff, N., 282 (Z.)
 Kissel, P., with Spillmann & Florentin, 981 (Lep.)
 Klarenbeek, A., 103 bis, 611 (Jaun.)
 Klauder, J. V. & Winkelman, N. W., 440 (Pel.)
 Klein, B., with Mollow, 441 (Pel.)
 Kleine, F. K., 759, 785, 802 (S.S.)
 —, van Hoof, L. & Duke, H. L., 781 (S.S.)
 Kligler, I. J., 351, 796 (S.S.) 809 (Z.) 849 (Y F.)
 — & Ashner, M., 850 (Y.F.)
 — & Rabinowitch, G., 351 (S.S.)
 Kling, C. A., 671 (Pl.)
 Klingmüller, V., 203 (Lep.)
 Klotz, O. & Simpson, W., 112 bis (Y. F.)
 Knauer, E., 626 (Dys.)
 Knowles, R., 324 (B.R.), 755 (B.R.)
 — & Gupta, B. M. D., 725 (Z.)
 — & Senior-White, R., 583 (B.R.), (158) (Mal.)
 Kobayashi, K., 965 (Hel.)
 Kober, P. A., 661 (Y. & S.)
 Kobori, K., 455 (Hel.)
 Kobozeff, N. I., with Joyeux, (474) (Hel.)
 Koch, D. A., (737) (Z.)
 Kcch, J., 196 (Rab.)
 Kodama, T., 633 (Dys.)
 Kofoid, C. A., 721 (Z.)
 Kohn, M., 939 (Hel.)
 Koidzumi, M., (293 bis) (Z.)
 — & Hakushi, R., 268 (Z.)
 Kokawa, H., 798 ter (S.S.)
 Koldajew, B., 192 (Rab.)
 Kolochine, C., with Pettit & Stefanopoulou, 851 (Y F.)
 Kolossow, J., with Herrmann & Lipin, 919 (Misc.)
 Komp, W. H. W., with Barber, 277 (Z.) 917 (Misc.)
 —, with — & Hayne, 124 (Mal.)
 —, with Maxcy & Barber, 558 (Mal.)
 Konsuloff, S., 560 (Mal.)
 Kopp, F. I., Dimitrieva, M. A. & Zwetkowa-Pirogovskaja, A. E., 934 (Hel.)
 Koppel, A., 665 (C.Bu.)
 Kopstein, F., 289 (Z.)
 Korb, J. H., with Miyamoto, 1001 (Misc.)
 Korke, V. T., 971 (Hel.)
 Korkes, L., with Luger, 635 (Dys.)
 Korteweg, P. C., 120 (Mal.)
 Kossarew, N., with Lourié & Rosenblatt, 506 (Und.)
 Kotelnikov, G., with Bezsonova & Semikoz, 674 (Pl.)
 Koulescha, G. S., 981 (Lep.)
 Kourilsky, R., with Lemierre, 619 (Am.)
 Kovács, N., with Kraus, 681, 682 (Chl.)
 Köveskuty, Jr., with Reiner, 344 (S.S.)
 Kowalewa, O., with Glusmann & Predtetschenskaja, 711 (Rab.)
 Krantzfeld, A. M., with Doubrovinsky, Rosenfeld & Salamandra, 934 (Hel.)
 Kraus, R., 678 (Chl.)
 — & Kovács, N., 681, 682 (Chl.)
 Kremer, W., with von Bánszky, (927) (Misc.)
 Kreuter, E., 43 (Und.)
 Kritschewski, I. L., 93 (R.F.), 407, 408 (Misc.)
 — & Rubinstein, P. L., 406 (Misc.)
 Kritschewski, J. L. & Friede, K. A., 598 (R.F.)
 Kritschewsky, J. L. & Lebedewa, M. N., 107 (Jaun.)
 Krjukoff, A., 687 (Sp.)
 Kröber, O., 828 (Z.)
 Kroó, H. & Mano, Y., 494 (Misc.)
 — & Schulze, F. O., 494 (Misc.)
 Krukow, A. N., 687 (Sp.)
 Külz, L., 499 (Misc.)
 Kunkel, L. O., 929 (B.R.)
 Kuno, Y., (501) (Misc.)

L

- Laake, E. W., with Parman, Bishopp, Cook & Roark, 827 (Z.)
 Labbé, M., Lomon & Seligman, 954 (Hel.)
 Labernadie, V., 200, 647 (Lep.) (501) (Misc.)
 — & André, Z., 651 978 (Lep.)
 — & Laffitte, N., 206 (Lep.)
 Laborderie, with Basset, 714 (Rab.)
 Lacorte, J. G., 356 (S.S.)
 —, with Godoy, 728 (Z.)
 Lacroix, A., with Dévé, 956 (Hel.)
 La Face, L., 819 (Z.)
 —, with Ottolenghi, Brotzu, Brighenti & Robuschi, 123 (Mal.)
 — & Sella, M., 578 (Mal.)
 Laffitte, N., with Labernadie, 206 (Lep.)
 de Lagoanère, J. L., with Anderson, 947, (Hel.)
 Lagrange, E., 588 (R.F.), 678 (Chl.)
 Lahiri, B. N., with Cunningham & Nicholas, 190 (Rab.)
 Laidler, P. W., 281 (Z.)
 Laigret, J., with Mathis & Sellards, 538 (Y F.)
 Laimo, F., with Davis & Cabarron, 125 (Mal.)
 Lake, G. C., with Watkins, 504 (Und.)
 Lal, C., with Shortt & Das, 419 (K.A.)
 Lambert, R. A., 459 (Hel.)
 — & Burke, A. M. B., 948 (Hel.)
 — & Hoffman, W. A., 948 (Hel.)
 Lambert, S. M., 969 (Hel.)
 Lambert, Jr., S. W., 263 (Z.)
 Lamson, P. D., Minot, A. S. & Robbins, B. H., 469 (Hel.)
 Lancet, (654) (Lep.)
 Landeman, E., with Muir & Henderson, 210 (Lep.)
 Landsteiner, K. & Levine, P., 310 (Chl.)
 — & van der Scheer, J., 495 (Misc.)
 Lane, C., 467, 937, 968 bis (Hel.)
 Lange, J., with Jahnel, 7 (Y. & S.)
 de Langen, C. D., 644 (Lep.)
 — & Hermans, E. H., 636 (Lep.)
 Langeron, J., 660 (Y. & S.)
 Langeron, M., 748 bis, 749 (Myc.)
 Langworthy, V. & Moore, A. C., 99 (Jaun.)
 Lanoue, H., (158) (Mal.)
 Lara, C. B., 644, 984 (Lep.)
 —, with Cruz & Paras, 979 (Lep.)
 —, with Roxas-Pineda & Nicolas, 984 (Lep.)
 —, de Vera, B. & Eubanas, F., 983 (Lep.)
 Lara, H., 305 (Chl.)
 La Rosa, 60 (K.A.)
 Larrousse, F., (738) (Z.)

- Lasnet, 844 (Y.F.)
 Lasser, P., 189 (Rab.)
 La Terza, 414 (Misc.)
 Laud, D. S., 675 (Pl.)
 Lauda, E. & Marcus, F., 837 (Z.)
 Lavier, G., 357, 358, 359 *bis*, 360, 768, 786, 800 (S.S.)
 Lavinder, C. H., 382 (Misc.)
 League of Nations, 115 (Mal.), 312 (Chl.), 759 (S.S.)
 Leão, A. E. de A., 740 (Myc.)
 —, with da Fonseca, 25 (Myc.) 31, 693, 696 *bis* (Der.) 741, 743 *quat.*, 744, 745 (Myc.)
 —, with — & Penido, 695 *bis* (Der.)
 Lebedewa, M. N., with Kritschewsky, 107 (Jaun.)
 Lebedjeva, M. & Ssinjuschina, M., 89 (R.F.)
 Lebedjeva, M., 93 (R.F.)
 Leber, A., 735 (Z.)
 Le Bourhis, 4 (Y. & S.)
 Lecomte, 369 (Misc.)
 Ledentu, G., 337 (S.S.)
 — & Vaucl, M., 118 (Mal.), 334, 335, 338, 339, 340 (S.S.)
 Leder, 802 (S.S.)
 Ledoux, Archer & Clerc, 512 (Und.)
 Lee, C. U. & Melcney, H. E., 578 (Mal.)
 —, with — & Chang, 268 (Z.)
 Lefrou, G., 529 (Fev.)
 Lega, G., 899 (Bl.)
 Legendre, F. M. A. & Cienfuegos, J. M. A., 144 (Mal.)
 Legendre, J., 39, (Der.) 55, 529 (Fev.) 274, 276 (Z.), (738), 806 (Z.) 914 (Misc.)
 Leger, M., 111 (Y.F.), 200 (Lep.), 430 (K.A.), 465 949, 970 (Hel.) (579) (Mal.) 888 (H.S.)
 Lehr, E., 197 (Rab.)
 Leiper, R. T., 948 (Hel.)
 Leitão, C. A. P., with Gomes & Wancolle, 643 (Lep.)
 Lemaire, A., with Loeper & Schulmann, 610 (Jaun.)
 Lemuerre, A. & Kourilsky, R., 619 (Am.)
 —, Marchal, G. & Jaubert, A., 508 (Und.)
 Le Moignic, 843 (Y.F.)
 Lépine, P. & Hitti, Y. K., 862 (K.A.)
 —, with Nattan-Larrier, 354 (S.S.)
 —, with — & May, 354 (S.S.)
 Lester, V., 232 (Dys.)
 Lestoquard, F., with Parrot & Donatien, 427 (K.A.)
 Leuchs, J. & Plochmann, E., 231 (Dys.)
 Levaditi, C., 720 (Z.)
 — & Anderson, T. E., 593 (R.F.)
 — & Delorme, M., 350, 797 (S.S.)
 — & Longinesco, J., 495 (Misc.)
 — & Schoen, R., 720 (Z.)
 Le-van-An, with Borel, 554 (Mal.)
 Levi, I., 977 (Lep.)
 Levine, P., with Landsteiner, 310 (Chl.)
 Lévy, G., with Chevallier, 803 (S.S.)
 Lewthwaite, R., 535 (Fev.)
 Li, K. H., (579) (Mal.)
 Licheri, A., 372 (Misc.)
 Lichtenstein, A., 4 (Y. & S.) 395, 405 (Misc.) 470 (Mal.)
 Lie, H.P., 640 (Lep.)
 Liljestrand, G., with Bjerlow, 94 (RF.)
 Lillie, R. D., with Goldberger, Wheeler & Rogers, 886 *bis* (Pel.)
 Lima, A. da C., (293), 835 (Z.)
 Limousin, H., with Deschiens & Troisic, 265 (Z.)
 —, with Troisier, Deschiens & Delorme, 963 (Hel.)
 Lindberg, K., 26 (Der.)
 Lindow, E. D., 208 (Lep.)
 Liodt, 931 (Hel.)
 Lipin, N., with Herrmann & Kolossow, 919 (Misc.)
 Lippincott, L. S., 556 (Mal.)
 Lipscomb, F. M. & Mansell, R. A., 129 (Mal.)
 Lischetti, A. B., 920 *bis* (Misc.)
 Lisgunova, A. W. & Butjagina, A. P., 406 (Misc.)
 Lisowa, A. I., with Chodukin, 128 (Mal.)
 Lissner, L., 933 (Hel.)
 Lister, F. S., 906 (Lab.)
 Liston, W. G., 489 (Misc.)
 Little, E. G., & Hasson, J., 211 (Lep.)
 Ljachowetzky, 129 (Mal.)
 Lloyd, L., 283 (Z.)
 Lloyd, R., with Skelton & Malcolm, 244 (Dys.)
 Loeper, M. & Garcin, R., 957 (Hel.)
 —, Schulmann, E. & Lemaire, A., 610 (Jaun.)
 Loganadan, A. D., with Wats & Conquest, 631 (Dys.)
 Lombardo, C. & Tornabuoni, G., 13 (Y. & S.)
 Lomon, with Labbé & Seligman, 954 (Hel.)
 Lomry & Gillet, 491 (Misc.)
 Lonero, G., 48 (Und.)
 Long, J. D., 317 (Pl.)
 Longinesco, J., with Levaditi, 495 (Misc.)
 Longo, D., 567 (Mal.)
 Lopes, 793 (S.S.)
 Lopes, I. C., 191 (Rab.)
 Lopez-Neyra, C. R., 460, 952 (Hel.)
 Lotsy, G. O., 168 (B.R.)
 Lotti, C. & Puxeddu, E., 385 (Misc.)
 Lourie M., Kossarew, N. & Rosenblatt, A., 506 (Und.)
 Low, G. C., 63 (K.A.), 564 (Mal.)
 — & Benton, D., 58 (Sp.)
 — & Cooke, W. E., 59 (Sp.)
 Luchini, F. P. & Perez de Mucci, R., 246 (Dys.)
 Lucksch, F., with Jahnel, 594 (R.F.)
 Luengo, E., 94 (R.F.)
 Luger, A. & Korkes, L., 635 (Dys.)
 Luis Carrera, J., 652 (Lep.)
 di Lullo, O., 699 (Der.)
 Lumbroso, U., 476 (Oph.)
 —, with Durand, P., 475 (Oph.)
 Luther, S., 434 (Bb.)
 Lynch, K. M., 616 (Am.)

M

- Maass, E., 374 (Misc.), 656 *bis* (Y. & S.)
 McAlpine, J. G. & Slanetz, C. A., 517 (Und.)
 MacArthur, W. P., 180 581 (Hist.)
 McCalla, R. L., with Hein & Thorne, 388 (Misc.)
 McCann, W. S., with Hunt, Rowntree, Voegtlin & Eggleston, (500) (Misc.)
 McCarrison, R., 469 *bis* (Misc.), 863, 878 (Bb.)
 MacCarthy, J. T., 444 (Pel.)

- McCarty, S. H., with Graham, 388 (Misc.)
 Macciotta, G., 560 (Mal.)
 McCulloch, W. E., 219 (Am.)
 Macdonald, G., with Blacklock, 901 (Bl.)
 McDonnell, A. J. V., 309 (Chl.)
 MacDougall, M. S., 262 (Z.)
 Macfie, J. W. S., 728 (Z.)
 McGavran, E. G. & Songkla, M., 951 (Hel.)
 McGillivray, W. S., 52 (Fev.)
 McGlinn, J. A., 16 (G.V.)
 MacGregor, I. G., 11 (Y. & S.)
 MacGregor, M. E., 79 (B.R.)
 McGuire, C., with Acton, 27 (Der.)
 Machado, A., 418 (Misc.)
 Macht, D. I., with Dunning, 347 (S.S.)
 Maciel, H., (247) (Dys.)
 MacInnes, A., 292 (Z.)
 McKendrick, A. G., 187, 706, 712 (Rab.)
 McKenzie, A., 118 (Mal.)
 Mackenzie, I., 112 (Y.F.) 127 (Mal.)
 Mackenzie, I. H. L., 397 (Misc.) 534 (Fev.), 939 (Hel.)
 Mackerras, I. M., 804 (Z.) 926 (Misc.)
 Mackey, C., 891 (Bl.)
 Mackie, A. S., 87 (R.F.), 161 (Bl.) *bis*
 Mackie, F. P., 298 (Lab.)
 Mackie, T. J. & McLachlan, D. G. S., 99 (Jaun.)
 McLachlan, D. G. S., with Mackie, 99 (Jaun.)
 McLavy, J. R., with Jacob, 496 (Misc.)
 MacLennan, N. M., with Philip, 964 (Hel.)
 McNabb, P. E. & Stewart, Jr., T. H., 569 (Mal.)
 MacPherson, J., 292 (Z.)
 MacQueen, J., 396 (Misc.)
 MacRae, A., 475 (Oph.)
 Madinaveitia, J. M., Ruiz, A. & Ramirez, P., 259 (Z.)
 Madon, E. E., with Dalal, 918 (Misc.)
 Madras, 299, 904 (Lab.)
 Magalhaes, O., 747 (Myc.)
 —, O. & Neves, A., 21, 741 (Myc.)
 Magath, T. B., 951 (Hel.)
 Maghraby, A. M., 480 (Hel.)
 Magnitsky, V. & Gutzevitch, A., 823 (Z.)
 Magrou, J., with Gosset & Bertrand, 751 (Myc.)
 Mahfuz, A. H., 950 (Hel.)
 Mahieu, A., with Pavlovsky & de Filippi, (973) (Hel.)
 Mahmud, S., with Martini, Irfan & Vogel 810 (Z.)
 Majima, M., 942 (Hel.)
 Majumder, B. C., with Ryles, 917 (Misc.)
 Malandkar, M. A., with Sokhey, 686 (Sp.)
 —, with — Gokhale & Billimoria, 688 (Sp.)
 Malaria Commissie voor Noordholland, 120 (Mal.)
 Malayan Medical Journal, 912 (Misc.)
 Malcolm, J. W., with Skelton & Lloyd, 244 (Dys.)
 Mallik, K. L. B., 683 (Chl.)
 Mallory, F. B., with Phelps, 396 (Misc.)
 Malone, R. H., with d'Herelle, 308 (Chl.)
 Manalang, C., 960, 963 (Hel.)
 Mandry, O. C., 625 (Dys.)
 — & Marin, R. A., 1002 (Misc.)
 Manifold, J. A., with de Monte, A. J., 632 (Dys.)
 (K1041)
 Mano, Y., with Kroó, 494 (Misc.)
 Manoloff-Sliven, S., 135 (Mal.)
 Manouélian, Y. & Viala, J., 189, 707 *ter* (Rab.)
 Mansell, R. A., with Lipscomb, 129 (Mal.)
 Mansfield-Aders, W., 551 (Mal.), 971 (Hel.)
 Manson-Bahr, P., 148, 564 *bis*, (Mal.) 511 (Und.) 655 (Y. & S.), 986 (Lep.)
 — & Anderson, S. M., 14 (G.V.)
 — & Maybury, L. M., 132 (Mal.)
 — & Sayers, E. G., 220 (Am.)
 Manteufel, P. & Herzberg, K., 659 (Y. & S.)
 Manwell, R. D., with Hegner, 137 (Mal.)
 Maplestone, P. A., 966 (Hel.)
 Maranhão, J. L., 867 (Bb.)
 Marcellus, M. B., 259 (Z.)
 Marchal, G., with Lemierre & Jaubert, 508 (Und.)
 Marchoux, E., 555 (Mal.), 851 (Y.F.)
 — & Caro, J., 978 (Lep.)
 Marcus, F., with Lauda, 837 (Z.)
 Margarot, J. & Deveze, P., 982 (Lep.)
 Margnesu, P., 122 (Mal.)
 Marie, A. C., 706 *bis* (Rab.)
 — & Mutermilch, S., 709 (Rab.)
 —, Remlinger, P. & Vallée, H., 706 (Rab.)
 Maric, J., with Debré & Giroud, 509 (Und.)
 Marin, R. A., with Mandry, 1002 (Misc.)
 Marras, A., 988 (Lep.)
 Marsh, E. B., 313 (Chl.)
 Marshall, H. K., 393 (Misc.)
 Marshall, J. F., 912 (Misc.)
 Martin, A. P., with Ross, 44 (Und.)
 Martin, C. de C., with Taylor & Thant, 866 (Bb.)
 Martin, H. M., 960 (Hel.)
 Martin, M., 295 (Lab.)
 Martin, S. H., 969 (Hel.)
 Martínez García, P., 60 (K.A.)
 Martini, E., 545 *bis* (Y.F.), (738) (Z.)
 —, Irfan, J., Mahmud, S. & Vogel, R., 810 (Z.)
 Martins, C., 742 *bis* (Myc.)
 Marugo, 791 (S. S.)
 de Marval, L., 643 (Lep.)
 Marzinowsky, E., 585 (R.F.)
 Masci, C., 601 (Fev.)
 Maselli, D., 560 *bis* (Mal.)
 Mason, R. E., 993 (Oph.)
 Massa, M., 147 (Mal.)
 Mastroianni, A., 306 (Chl.)
 Matarangas, G., 426 (K.A.), 556 (Mal.)
 Mateisco, E., with Nicolau, 709 (Rab.)
 Matheson, R. & Hinman, E. H., 806 (Z.), 918 (Misc.)
 Mathis, C., 87, 587 *ter*, 588 *bis*, 597 (R.F.)
 —, Cazanove, F. & Bacqué, M., 545 (Y.F.)
 —, Durieux, C. & Ewstieief, C., 87
 —, Sellards, A. W. & Laigret, J., 538 (Y.F.)
 Matsushita, M., 610 (Jaun.)
 da Matta, A., 694, (705) (Der.)
 Matthiasson, S., 461 (Hel.)
 Mattos, E., (321) (Pl.), (549) (Y.F.)
 Maxcy, K. F., Barber, M. A. & Komp, W. H. W., 558 (Mal.)
 Maxwell, J. L., (313) (Chl.)
 Maxwell, J. S., 663 (Y. & S.)
 May, J., with Nattan-Larrier & Lépine, 354 (S.S.)
 Maybury, L. M., with Manson-Bahr, 132 (Mal.)
 Mayeda, I., 629 (Dys.)

- Mayeda, M., 160 (Bl.)
 Mayeda, S., with Giemsa, 346 (S.S.)
 Mayer, M., Borchardt, W. & Kikuth, W., 254 (Z.)
 — & Kikuth, W., 521 (Fev.)
 — & Ray, J. C., 859 (K.A.)
 Mayer, T. F. C., 978 (Lep.)
 Mayo, 754 (B.R.)
 Mazza, S., 287 (Z.) (474) (Hel.)
 —, Forté, E., Alvarez Soto, N. Arias Aranda, C., 133 (Mal.)
 — & Parodi, S., 744 (Myc.)
 Mazzolani, D., (535) (Fev.)
 Mebius, J., 870 (Bb.)
 Medeiros, L., 200 (Lep.)
 Megaw, J. W. D., 755 (B.R.)
 — & Gupta, J. C., 364 (Misc.)
 — & Mullick, M. N., 923 (Misc.)
 Meihuizen, F. H., 418 (Misc.)
 Meillon, B., with Ingram, 815 (Z.)
 Meleney, H. E., 592 (R F), 717 (Z.)
 —, with Lee, 578 (Mal.)
 —, Lee, C. U. & Chang, H. L., 268 (Z.)
 de Mello, F., 448 (Hel.)
 — & Vernencar, H. P., 578 (Mal.)
 Melnotte, P. & Farjot, A., 100 (Jaun.)
 Melnotte, P. E. M., with Fontanel, 222 (Am.)
 Mendel, L. B., with Underhill, 885 (Pel.)
 Menk, W., 36 (Der.), 378 (Misc.)
 Mercier, L., 827 (Z.)
 Merighi, G., with Schiassi, 565 (Mal.)
 Mesnard, J., with Bablet, 402 (Misc.)
 Messieri, A., 511 (Und.)
 Messine, R., (635) (Dys.)
 Metelkin, A. I., 427 (K.A.)
 Mételkune, A., (293) (Z.)
 Mhaskar, K. S., with Caus, 410 (Misc.)
 Miller, W. E., with Arnold, 48 (Und.)
 Minot, A. S., 417 (Misc.)
 —, with Lamson & Robbins, 469 (Hel.)
 Missiroli, A., 155 (Mal.), 820 (Z.)
 — & Hackett, L. W., 122 (Mal.)
 Mital, B. P., 285 (Z.)
 Mitchell, J. H., 698 (Der.)
 Miwa, F., 971 (Hel.)
 Miyagawa, Y., 193 (Rab.)
 — & Ishii, S., 195, (715) (Rab.)
 Miyairi, K. & Takahashi, S., 52 (Fev.)
 Miyamoto, K. & Korb, J. H., 1001 (Misc.)
 Mochtar, A., with Schüffner, Proehoeman & Honig, 544 (Y F)
 Mohile, G. B., with Vad, 137 (Mal.)
 Moldawska, W., with Rubaschkin & Pauli, 153 (Mal.)
 Molinelli, E. A., 979 (Lep.)
 Mollow, W., 566 (Mal.), 883 (Pel.)
 — & Klein, B., 441 (Pel.)
 Momma, K., 952 *bis* (Hel.)
 Montagnani, M., 506 (Und.)
 de Monte, A. J., with Manifold, 632 (Dys.)
 Montel, L. R., 626 (Dys.)
 Monteleone, R., 577 (Mal.)
 Montero, A., 638 (Lep.)
 Montoro, O., (501) (Myc.)
 Montpellier, J. & Catanei, A., 24 (Myc.) 692, 695 (Der.)
 —, — & Clapier, P., 30 (Der.)
 —, —, & Colonieu, L., 392 (Misc.), 740 (Myc.)
 —, & Colonieu, L., 392 (Misc.)
- Moore, A. C., with Langworthy, 99 (Jaun.)
 Moore, K. R., 51 (Fev.)
 Mooser, H., 600 (Fev.)
 Moreels, W., with Van den Branden, 747 (Myc.)
 Moreels, with — & Clevers, 341 (S.S.)
 Moreira, M., 201 (Lep.)
 Morenas, with Cade & Jeannin, 939 (Hel.)
 —, with Tixier, Favre & Petouraud, 217 (Am.)
 Moretti, P., 591 (R.F.)
 Morgan, J., 449 (Hel.)
 Morin, H. G. S., 553 (Mal.)
 — & Guillerm, J., 628 (Dys.)
 Morishita, J. M. & Namikawa, H., 568 (Mal.)
 Morishita, K. & Furutama, T., 146 (Mal.)
 —, — & Namikawa, H., 146 (Mal.)
 Morison, J., 297 (Lab.)
 Morisseau, R., 100 (Jaun.)
 Morvan, Voizard, F. & Baize, 448 (Hel.)
 Moschkowski, S., 345 (S.S.), (579) (Mal.)
 —, with Péterfi, 429 (K.A.)
 Motta, J., 204 (Lep.)
 Moulin, H., with Tiprez, 936 (Hel.)
 Mounier, with Garin & Doubrow, 936, 966, 970 *bis* (Hel.)
 Moutier, F., 827 (Z.)
 Mouzon, J., (158) (Mal.)
 Much, Peemöller & Haim, 291 (Z.)
 Mudd, S., 929 (B.R.)
 Mühlens, P., 135, 564 (Mal), 377 (Misc.), 634 (Dys.)
 Muir, E., 204, 205, 207, 982 (Lep.) (429) (K.A.)
 — & Chatterji, S. P., 649 (Lep.)
 — & Henderson, J. M., 653 (Lep.)
 —, — & Landeman, E., 210 (Lep.)
 Mu Jui-Wu, 443 (Pel.)
 Mukerjee, S. K., 994 (Oph.)
 Mukerji, A. K., 448, 467 (Hel.)
 Mukerji, S. B., (158) (579) (Mal.)
 Mukherjee, H. N., 858 (K. A.)
 Mulholland, H. B. & Bray, W. E., 610 (Jaun.)
 Muller, H. R., 498 (Misc.)
 Muller, I., with Graf, 418 (Misc.)
 Mullick, M. N., with Chopra, Gupta, J. C., & Gupta, A. K. D., 858 (K.A.)
 —, with Megaw, 923 (Misc.)
 Muniz, J., with da Cunha, 54, 523 (Fev.), 264 *bis*, 725 (Z.)
 Munro, A. C., 278 (Z.)
 Murata, T., Itoh, T. & Ogawa, K., 698 (Der.)
 Muraz, G., 782 (S.S.)
 Murray, F. J., (973) (Hel.)
 Musser, J. H., 213 (Am.)
 Mutermilch, S., with Marie, 709 (Rab.)
 — & Salamon, E., 352, 797 (S.S.)
 Myers, G. S., 915 (Misc.)
 Mylrea, C. S. G., 734 (Z.)

N

- Nadkarni, K. M., 502 (B.R.)
 Nagano, K., 452 (Hel.)
 Naidu, A. S., 729 (Z.)
 —, with Caius & Kamat, 319 (Pl.)
 Naidu, B. P. B. & Shamsher Jang, 320 (Pl.)
 Nair, T. D., 656 (Y. & S.)
 Nakamura, H., with Sazerac, 101 (Jaun.)
 Nakamura, S., 98 (Fev.)

Namikawa, H., 361 (S.S.)
 —, with Morishita, 568 (Mal.)
 —, with — & Furutama, 146 (Mal.)
 Nannizzi, A., 20 (Myc.)
 Nanta, A., 165 (Myc.), 400 (Misc.), 749 (Myc.)
 —, with Pinoy, 163 (Myc.)
 Napier, L. E., 62, 68, 425, (429) (K.A.), 756 (B.R.)
 —, with Acton, 70 (K.A.)
 — & Gupta, C. R. D., 858 (K.A.)
 — & Halder, K. C., 62 (K.A.)
 National Medical Association of China, 330 (B.R.)
 Nattan-Larrier, L., 354 (S.S.)
 — & Lépine, P., 354 (S.S.)
 —, — & May, J., 354 (S.S.)
 Neame, H., (362) (S.S.)
 Nechkovitch, M., 291 (Z.)
 Nederlandsch Tijdschrift voor Geneeskunde, 370 *bis* (Misc.)
 Neff, E. A., 975 (Lep.)
 Nénon, J., 641 (Lep.)
 Neprjachin, G. G., 146 (Mal.)
 Nessmann, V. & Trensz, F., 946 (Hel.)
 Neves, A., with de Magalhães, 21 (C.Bu.), 741 (Myc.)
 Neveu-Lemaire, 447 (Hel.)
 — & Pellegrin, J., 935 (Hel.)
 Neviadomsky, M. M., 138, 579 (Mal.)
 Newham, H. B., 496 (Misc.), 806 (Z.)
 Newstead, R. & Carter, H. F., 804 (Z.)
 Nicaud, P., 746 (Myc.)
 Nicholas, M. J., with Cunningham & Lahiri, 190 (Rab.)
 Nicholls, L., 278 (Z.)
 —, with Denny, 382 (Misc.)
 Nicholson, D., 951 (Hel.)
 Nicol, W. D., with James & Shute, 573 (Mal.)
 Nicolas, C., 55 (Fev.)
 — & Roxas-Pineda, E., 645, 983 (Lep.)
 —, with — & Lara, 984 (Lep.)
 Nicolau, S. & Mateiesco, E., 709 (Rab.)
 Nicoll, W., 451 (Hel.)
 Nicolle, C., 84 (R. F.), 476 (Oph.)
 — & Anderson, C., 83 *ter*, 85, 90 *bis*, 91 *ter*, 586, 596 (R.F.)
 —, — & Colas-Belcour, J., 89 *bis*, (599) (R.F.)
 Nierenstein, M., 903 (Bl.)
 Nieschulz, O., 283 (Z.)
 Nigeria, 295 (Lab.)
 —, Ann. Rep. Med. Res. Inst., 294 (Lab.)
 Nikanoroff, 671 (Pl.)
 Niño, F. L., 356 (S.S.)
 — & Puglisi, A., 23 (Myc.)
 Nishigori, M., 962 (Hel.)
 Nishimura, K., 961 (Hel.)
 van Nitsen, R., 5 *bis*, 660 (Y. & S.), 147 (Mal.) 223 (Am.), 597 (R.F.)
 van Nitsen, R., 139 (Mal.)
 Nitzulescu, V., 279, 286, 809, 827, 828 (Z.)
 Nocht, B., 921 (Misc.)
 Noda, Y., 967 (Hel.)
 Noel, P., 704 (Der.)
 Noguchi, H., 476 *bis* (Oph.), 524, 525, 526 (Fev.), 990 (Oph.)
 Nohira, A., with Ishikawa, 39 (Der.)
 Nohl, J., 248 (B.R.)
 Novillo Pizarro, R., with Ovejero Paz, 428 (K.A.)
 (K1041)

Núñez Tovar, M., with Dyar, 266 (Z.)
 Nye, R. N., Zerfas, L. G. & Cornwell, M. A., 998 (Misc.)

O

Oba, T., 967 (Hel.)
 Oberling, C., 750 (Myc.)
 Ocampo, A. N., with Albert, 869 (Bb.)
 Ochoterenia, I., 474 (Hel.)
 O'Connor, F. W., 472 (Hel.)
 Ogawa, K., with Murata & Itoh, 698 (Der.)
 Ogilvie, A. G., 497 (Misc.)
 Ohta, J., 942 (Hel.)
 Ohtsubo, I., with Takano & Inouye, (684) (Chl.)
 Okuwada, S., with Kawatani, 190 (Rab.)
 Oldt, F., with Chan, 478 (Oph.)
 Olitsky, P. K., 929 (B.R.)
 Olivares, R., 385 (Misc.)
 Olivero, C., 507 (Und.)
 Olivier, P. H. & Hulshoff, A. A., 565 (Mal.)
 — & Kandou, R., 454 (Hel.)
 Olmer, D., with Burnet, 530 (Fev.)
 Ongkiehong, H. F., (599) (R.F.)
 Orachowatz, D., 567 (Mal.)
 Orenstein, A. J., 964 (Hel.)
 Orgaz, J., with Castellano, 957 (Hel.)
 Orlandi, N., 748 (Myc.)
 Orr, P. F. & Huddleson, I. F., 515 (Und.)
 Oshiro, M. & Yushvo-Kei, 875 (Bb.)
 Ota, M., with Hashimoto, Ishibashi & Iwatake 28 (Der.)
 Otero, P. M., 850 (Lep.)
 — & Hernández, L. G., 979 (Lep.)
 Otto, G. F., with Ackert, 451 (Hel.)
 Otto, R., 292 (Z.)
 Ottolenghi, D. with Brotzu, G., La Face, I., Brighenti, D. & Robuschi, L., 123 (Mal.)
 Ouchakov, W. G., 712 (Rab.)
 Ouy-Vernazobres, C., 174 (Hist.)
 Ovazza, V. E. (579) (Mal.)
 Ovejero Paz, A. & Novillo Pizarro, R., 428 (K.A.)
 Owen, D. U., 73, 861 (K.A.)
 —, with Stephens, 149 (Mal.)
 Oyarzabal, J., with Biglieri & Villegas, 192 (Rab.)

P

Pacella, G., with Sordelli, 292 (Z.)
 Pacheco, G., 626 (Dys.), 722 (Z.)
 Paes, A., 401 (Misc.)
 Paisley, J. C., 318 (Pl.)
 —, with Connal, 672 (Pl.)
 Pal, R. D., 319 (Pl.)
 Palatios, C., with Santillan, 32 (Der.)
 Palacios de Borao, G., 975 (Lep.)
 Palaska, R., 10 (Y. & S.)
 Paldrock, A., 204, 207, 985 (Lep.)
 Palestine, 907 (Lab.)
 Palmer, A., 292 (Z.)
 Palmer, F. J., 305, 677 (Chl.)
 Pampana, E. J., 585 (R.F.)
 Panama Canal Zone, 569 (Mal.)
 Panayotatou, A., 24 (Myc.), 238 (Dys.)
 Panja, G., 76 (K.A.)
 —, with Acton, 697 (Der.)

- Pantschenkow, M. M. & Kirstner, A. A., 493 (Misc.)
 Papadopoulos, J., with Petzetakis, 751 (Myc.)
 Papamarku, P., 495 (Misc.)
 Paponnet, with Vialard, 619 (Am.)
 Paras, E. M., with Lara & Cruz, 979 (Lep.)
 Parman, D. C., Bishopp, F. C., Laake, E. W., Cook, F. C. & Roark, R. C., 827 (Z.)
 Parodi, S., with Mazza, 744 (Myc.)
 Parrot, L., 824 (Z.)
 — & Donatien, A., 75 (K.A.)
 —, — & Lestoquard, F., 427 (K.A.)
 Parshall, C. J., with Carpenter, 49 (Und.)
 Parsons, R. P., 5, 6, 664 (Y. & S.)
 Partearroyo, F. R., 505 (Und.)
 Pascheff, C., 475 (Oph.)
 Pasqual, J. H., (501) (Misc.)
 Pasquini Lopez, C., 32 (Der.)
 Pasteur, F., with Phisalix, 732 bis (Z.)
 Pastore, S., 575 (Mal.)
 Patané, C., 8 (Y. & S.)
 Patel, G. P., with Campbell, 404 (Misc.)
 Paton, L., 993 (Oph.)
 Patto, J. O., 233, 234 (Dys.)
 Patton, W. S. & Hindle, E., 822 (Z.)
 —, with —, 64 (K.A.)
 Paul, N., 884 (Pel.)
 Pauli, S., with Rubaschkin & Moldawskaja, 153 (Mal.)
 Pautrier, L. M., 641 (Lep.)
 Pavlovsky, A. J., Mahieu, A., & de Filippi, (973) (Hel.)
 Pavlowsky, E. N., & Stein, A. K., 287 (Z.)
 Pawan, J. L., 150 (Mal.)
 Pawlowsky, E. N., 429 (K.A.)
 — & Stein, A. K., 288, 834 (Z.)
 Pearce, T. V., 957 (Hel.)
 Pecori, G., & Escalar, G., 156 (Mal.)
 Peemöller, with Much & Haim, 291 (Z.)
 Pellegrin, J., with Neveu-Lemaire, 935 (Hel.)
 Peña Chavarria, A., 656 (Y. & S.)
 Penido, J. C., with da Fonseca & Leão, 695 bis (Der.)
 Peon, I. E., with Brosius & Carrol, 969 (Hel.)
 Pereira, L., 561 (Mal.)
 Perez de Nuceri, R., with Luchini, 246 (Dys.)
 Perfiliev, P. P., 824 (Z.)
 Perfiliew, P., 286, (Z.)
 Perfiljew, P., 824 (Z.)
 Pern, S., 292 (Z.)
 Perry, H. M., & Hensted, H. J., 624 (Dys.)
 Perumal, M. V., 132 (Mal.)
 Peruzzi, M., 771, 787 (S.S.)
 Peryassu, A. G., 548 (Y.F.)
 Peter, F. M., 34 (Der.), 622 (Am.), 642 (Lep.)
 Péterfi, T., & Moschkowski, S., 429 (K.A.)
 Peterman, M. G., (293) (Z.)
 Peterson, E., with Butler, 1 (Y. & S.), 125 (Mal.)
 Petouraud, C., with Tixier, Favre & Morenas, 217 (Am.)
 Petragiani, G. & Castelli, A., 275 (Z.)
 Pettit, A., 840 (B.R.)
 — & Stefanopoulou, G., 850 (Y.F.)
 —, — & Aguessy, C., 850 (Y.F.)
 —, — & Frasey, V., 851 (Y.F.)
 —, — & Kolochine, C., 851 (Y.F.)
 Petzetakis, M., & Papadopoulos, J., 751 (Myc.)
 Pewny, W., 150 (Mal.)
 Peyre, E. L., 650, 651 (Lep.)
 de Peyrelongue, 478 (Oph.)
 Phelps, B. M., & Mallory, F. B., 396 (Misc.)
 Philip, C. R., 373 (Misc.), 448 (Hel.)
 — & MacLennan, N. M., 964 (Hel.)
 Phillis, E., with Browning, Cohen, Gulbransen, & Snodgrass, 94 (R.F.)
 Phisalix, 732, 733 bis (Z.)
 — & Pasteur, F., 732 bis (Z.)
 Photinos, T., 701 (Der.)
 Piana, G. A., 576 (Mal.)
 Picado, C., 733 (Z.)
 Pickard, R. J., 256 (Z.)
 Pickens, E. M., & Reed, R. C., 715 (Rab.)
 Pickworth, F. A., 234 (Dys.)
 Piéchaud, F., 176 (Hist.)
 Pieri, J., with Boinet, 532 (Fev.)
 Pierini, L. E., with Puente, (654) (Lep.)
 Pigoulesky, S. W., 455 (Hel.)
 Pigoulésky, S. W., 455 bis, (974) (Hel.)
 Piper, A. & Pullinger, B. D., 30, 696 (Der.)
 Pilod, Codvelle & Hugonot, 453 (Hel.)
 Pineda, E. V., 639, 653 (Lep.)
 Pino Pou, R., 378 (Misc.)
 Pinoy, 749 (Myc.)
 — & Nanta, A., 163 (Myc.)
 Pinto, C., Barreto, J. de B. & Fialho, A., 829 (Z.)
 Pirot, 527 (Fev.), 617 (Am.)
 Pissurlencar, P., 171 (Hist.)
 Pittaluga, G., 70 (K.A.), 546 (Y.F.)
 Plantureux, E., 195, 707, (715) (Rab.)
 Plaut, F., 591, 593 (R.F.)
 Plawtow, K. A., 559 (Mal.)
 Plehn, A., 151, 579 (Mal.)
 Plochmann, E., with Leuchs, 231 (Dys.)
 Pogorschelsky, H., 238 (Dys.)
 Poisson, A., & Randiambelona, 958 (Hel.)
 Polak, H. J., 657 (Y. & S.), 699 (Der.)
 Poletti, R. A., with Castex & González, 892 (Bl.)
 Ponomareff, A. W., 236 (Dys.)
 — & Tchechkoff, A., 191 (Rab.)
 Ponomarew, A. W. & Tchechkow, A. M., 709 (Rab.)
 Pons, R., & Advier, M., 382 (Misc.)
 Pons-Leychard, 73 (K.A.)
 —, with Gueidon, 73 (K.A.)
 del Ponte, E., with Shannon, 820, 825 (Z.)
 —, with — & Davis, 816 (Z.)
 Popov, S. P., & Shapshev, K. N., 128 (Mal.)
 Popow, P., 824 (Z.)
 — & Zeiss, H., 890 (Bl.)
 Popesco-Combiesco, C., 311 (Chl.)
 Popper, N. & Raileanu, C., 750 (Myc.)
 Postmus, S., with Sardjito, 611 (Jaun.)
 Potter, L. A., 724 (Z.)
 Póvoa, H., 416 (Misc.)
 Powell, L., 630 (Dys.)
 Power, P., 14 (Y. & S.)
 Pozariski, P. F., 77 (K.A.)
 Prado, A., (738) (Z.)
 Prates, M. M., 768 (S.S.)
 Prausnitz, C., 187 (Rab.)
 Predtetschenskaja, L., with Glusmann & Kowalcza, 711 (Rab.)
 Presse Médicale, 749 (Myc.)
 Prigge, R. & Rothermundt, M., 592 (R.F.)
 Prince, L. H., with Wight, 256 (Z.)
 Proceedings of the Royal Society of Medicine, 739 (Myc.)

- Proehoeman, S., with Schöffner, Mochtar & Honig, 544 (Y.F.)
 Prum, T. & Vigoni, M., 373 (Misc.)
 Prunelle, M., with Senevet, 818 *bis* (Z.)
 Przesmycki, F., 487 (Misc.)
 Public Health Bulletin, Washington, 980 (Lep.)
 Public Health Reports, 276 (Z.), 848 (Y.F.)
 Puente, J. J., 17 (G. V.)
 — & Pierini, L. E., (654) (Lep.)
 Puglisi, A., with Niño, 23 (Myc.)
 Pulido, A., 558 (Mal.)
 Pullon, E. D., with Brown, 129 (Mal.)
 Pullinger, B. D., with Pijper, 30, 696 (Der.)
 Puntoni, V., 105 *bis* (Jaun.), 714 (Rab.)
 Puri, I. M., (293) (Z.)
 Puxeddu, E., with Lotti, 385 (Misc.)
- Q**
- Quast, G. & Rotter, R., 714 (Rab.)
 Quémener, E., 69 (K.A.), (313) (Chl.), 965 (Hel.)
 Quiaison, J. O., with Albert, 231 (Dys)
- R**
- Rabe, H., 690 (Sp.)
 Rebello, S., da Costa, S. F. G. & Rico, J. T., 938 *bis* (974) *ter* (Hel.)
 Rabnowitch, G., with Kligler, 351 (S.S.)
 Rachina, M. G., (158) (Mal.)
 Rae, W., 202 (Lep.)
 Raffaele, G., 818 (Z.)
 Raileanu, C., with Popper, 750 (Myc.)
 Ramalhao, C., 629 (Dys.)
 Rambault-Simon, with Carrieu, 724 (Z.)
 Ramirez, P., with Madinaveitia & Ruiz, 259 (Z.)
 Ramos e Silva, J., 704 (Der.)
 Ramsay, G. C., 2 (Y. & S.)
 Ramsdell, S. G., 463 (Hel.)
 Randiambelona, with Poisson, 958 (Hel.)
 Rangoon, 905 (Lab.)
 Rao, B. K. N., 475 (Oph.)
 Rapoport, J. L., 899 (Bl.)
 Ratcliffe, H., with Hegner, 258 (Z.)
 Ratcliffe, H. L., 574 (Mal.)
 Raúl Goyena, J., 219 (Am.)
 Ravitsch-Tscherbo, M. I., with Adowa, 814 (Z.)
 Rawson, P. H., with Johnson, 284 (Z.)
 Ray, C., 69 (K.A.), 438 (Bb.)
 Ray, I. C., 858 (K.A.)
 Ray, J. C., with Engelhardt, 311 (Chl.)
 —, with Mayer, 859 (K.A.)
 Raymond-Hamet, 245 (Dys.)
 Raynal, J., 140, 550 (Mal.)
 Read, B. E., (654) (Lep.)
 Readio, P. A., 832 (Z.)
 Rebello, S., da Costa, S. F. G. & Rico, J. T., 464 (974 *ter*) (Hel.)
 Rechnitzer, S., 991 (Oph.)
 Reed, A. C. & Ash, J. E., 688 (Sp.)
 Reed, R. C., with Pickens, 715 (Rab.)
 Regendanz, P. & Kikuth, W., 838 (Z.)
 —, with Reichenow, 349 (S.S.)
 Reichenow, E. & Regendanz, P., 349 (S.S.)
 Reiner, L. & Köveskuty, Jr., J., 344 (S.S.)
 Reitani, V., with Cerruti, 110 (Jaun.)
 Remlinger, 547 (Y.F.)
 Remlinger, F., 390 (Misc.)
 Remlinger, P., 614 (Am.), 187, 706 *bis*, 708, 710, 713 (Rab.), (715) (Rab.)
 — & Bailly, J., 196 *bis*, 708, 711, 713 (Rab.), 987 (Lep.)
 —, with Marie & Vallée, 706 (Rab.)
 Renault, J., 549 (Y.F.)
 Renaux, E., 613 (Jaun.)
 Rennie, J., 283 (Z.)
 Revista Médica de Angola, 784 (S.S.)
 Rezende, M. & Fernandes, E., 664 (Y. & S.)
 Ribeyro, R. E., 521 (Fev.)
 Rice, T. B. & Beatty, N., 715 (Rab.)
 Rico, J. T., 960 (947) *bis* (Hel.)
 —, with Rebello & da Costa, 464, 936 *bis*, (974) *ter* (Hel.)
 Ricou, J. D., (927) (Misc.)
 Riding, D., 488 (Misc.)
 Riecke, H. G., 977 (Lep.)
 Riesman, D. & Ahlfeldt, F. E., 745 (Myc.)
 Rigollet, S., 547 (Y.F.)
 Rille, 883 (Pel.)
 Risacher, S., (579) (Mal.)
 Riskey, F. A. (579) (Mal.)
 Ritchie, T. R., 655 (Y. & S.), 970 (Hel.)
 Riva, A., with De La Barrera, 450 (Hel.)
 de Rivas, D., 447, 450 (Hel.)
 Rivers, T. M., 188 (Rab.), 929 (B. R.)
 Roark, R. C., with Parman, Bishopp, Laake & Cook, 827 (Z.)
 Robbins, B. H., with Lamson & Minot, 469 (Hel.)
 Robertson, M., 260 (Z.)
 Robic, J., with Girard, 650 (Lep.)
 Robineau, 637 (Lep.)
 Robineau, M., 144 (Mal.)
 Robinson, F. E., 45 (Und.)
 Roblès, R., 703 (Der.)
 —, with Galliard, 524 (Fev.)
 Robuschi, L., with Ottolenghi, Brotzu, La Face, & Brighenti, 123 (Mal.)
 Rocca, G. C., 622 (Am.)
 da Rocha Lima, H., 703 (Der.)
 Rockefeller Foundation, 1006 (B.R.)
 Rodenwaldt, E., 272, 815 (Z.)
 Rodriguez, J. N., with Wade, 638 (Lep.)
 Rodriguez, P. A., 477 (Oph.)
 Roegholt, M. N., 394, 996 (Misc.)
 Roelisma, H. L., 403 (Misc.)
 Rogers, L., 329 (B.R.), 646, 647 (Lep.)
 Rogers, L. M., with Goldberger, Wheeler & Lillie, 886 *bis* (Pel.)
 Rogowa, G. J., with Brussin, 589 (R.F.)
 Rohardt, W., (501) (Misc.)
 Rolland, P., with Duvé, 956 (Hel.)
 Romanowa, K., with Roskin, 429, 862 (K.A.)
 Romby, P., 576 (Mal.)
 Romiti, C., 383 (Misc.)
 de Rook, H. & Swellengrebel, N. H., 919 (Misc.)
 —, with —, 816, 820 (Z.), 915 (Misc.)
 Root, F. M., 269, (293) (Z.)
 Roques, A., with Gougerot & Bertillon, 670 (G.V.)
 Roqués, P., 319 (Pl.)
 Rose, F. G., 636, 646 (Lep.)
 Rosenblatt, A., with Lourié & Kossarew, 506 (Und.)

- Rosenfeld, V. D., with Doubrovinsky, Kranzfeld & Salamandra, 934 (Hel.)
 Rosenholz, H. P. & Gilbert, M. J., 86 (R.F.)
 Rosenthal, G., 138 (Mal.)
 Roskin, G. & Romanowa, K., 429, 862 (K.A.)
 — & Schischlaiewa, S., 361 (S.S.), 725 (Z.)
 Ross, G. R., 45, 46, 48, (Und.), 142 (Mal.) 894, 897 (Bl.)
 — & Martin, A. P., 44 (Und.)
 Ross, I. C., 954 (Hel.)
 Ross, R., 119 (Mal.) (501) (Misc.)
 Ross, W. C., 684, (684) (Chl.), 856 (K.A.)
 —, with Bagchi, K. N. & Roy, B. C., 677 (Chl.)
 Rothermundt, M., with Prigge, 592 (R.F.)
 Rotter, R., with Quast, 714 (Rab.)
 Roubaud, E., 111 (Y.F.), 279, 810, 812, 821, 822, 830, 832 (Z.), 556 (Mal.)
 — & Weiss, A., 831 (Z.)
 Roussel, B., 972 (Hel.)
 Rowntree, L. C., with Hunt, McCann, Voegtlin & Eggleston, C., (500). (Misc.)
 Roxas-Pineda, E., Nicolas, C. & Lara, C. B., 984 (Lep.)
 —, with —, 645, 983 (Lep.)
 Roy, A. C., with Boyd, 642 (Lep.)
 Roy, B. C., with Ross & Bagchi, 677 (Chl.)
 Roy, M. M., 993 (Oph.)
 Roy, N. N., 413 (Misc.)
 Rubaschkin, W., Moldawskaja, W. & Pauli, S., 153 (Mal.)
 Rubino, A. P., 98 (Fev.)
 Rubino, P., with Varela & Garcia de San Martin, 724 (Z.)
 Rubinstein, P. L., 925, 926 (Misc.)
 —, with Kritschewski, 406 (Misc.)
 Ruddock, J. C., 42 (Und.)
 Rüdel, O., 981 (Lep.)
 Rudolfs, W., 808 (Z.)
 Ruge, H., 563 (Mal.)
 Ruge, R., 557 (Mal.)
 Ruiz, A., with Madinaveitia & Ramirez, 259 (Z.)
 Rusk, G. Y., with Smith, 96 (R.F.)
 Russell, A. J. H., 312 (Chl.)
 — & Sundararajan, E.R., (684) (Chl.)
 Russell, H., (293) (Z.)
 Russo, (927) (Misc.)
 Rutherford, N. J. C., 913 (Misc.)
 Ruys, A. C., 97 *bis* (Fev.)
 Ryles, C. S. & Majumder, B. C., 917 (Misc.)
- S**
- Sabrazès, J., 612 (Jaun.)
 Sachs, I., 993 (Oph.)
 Saenz de Santa Maria y Marrón, R., 426 (K.A.)
 Sagayam, A. D., 437 (Bb.)
 Sagel, W., 591 (R.F.)
 Sagredo, N., 289 (Z.)
 Said, R., 478 (Oph.)
 Saito, M., 801 *bis* (S.S.)
 Saltzewa, E. V., 308 (Chl.)
Salamandra, E. G., with Doubrovinsky, Kranzfeld & Rosenfeld, 934 (Hel.)
 Salamon, E., with Mutermilch, 352 *bis*, 797 (S.S.)
 Salimbeni, A. T. & Sazerac, R., 98 (Fev.)
Sambon, L. W., 833 (Z.)
 Sampoerno & Soetedjo, 398 (Misc.)
 Sanarelli, G., 95 *bis* (R.F.), 488 (Misc.)
 Sanarelli, J., 711 (Rab.)
 Sanderson, E. S., & Smith, D. C., 746 (Myc.)
 Sandground, J. H., 962 (Hel.)
 Sandler, S. A., 58 (Sp.)
 Sanford, A. H., 486 (Misc.)
 Sankine, (974) (Hel.)
 San Martin, A., with Schilling, 838 (Z.)
 Sanmartino, R., 247 (Dys.)
 Sannicandro, G., 661 (Y. & S.)
 Santillan, P. & Palacios, G., 32 (Der.)
 Sanyal, C., 421 (K.A.)
 Saphir, O., with Scott, 508 (Und.)
 Sappa, S., 507 (Und.)
 Sarcas, S. L. & Gupta, B. M., 437 (Bb.)
 Sardjito, M., 624 *bis* (Dys.)
 — & Postmus, S., 611 (Jaun.)
 Sargent, J. C., 15 (G.V.)
 Satov, T., 864 (Bb.)
 Saunders, G., 788 (S.S.)
 Saunders, G. F. T., 795 (S S)
 Sautet, J., 225 (Am.)
 Savage, P., 60 (K.A.)
 Sawyer, W. A. & Bauer, J. H., 545 (Y.F.)
 Sayed, F. A., 997 (Misc.)
 Savers, E. G., with Manson-Bahr, 220 (Am.)
 Sazerac, R., Hosoya, S. & Stefanopoulo, G., 101 (Jaun.)
 — & Nakamura, H., 101 (Jaun.)
 —, with Salimbeni, 98 (Fev.)
 Scarlett, H. W., 483 (Oph.)
 Schaburaw, A., 712 (Rab.)
 Schachsuarly, M., 145 (Mal.)
 Schaeffer, H. F., 888 (H.S.)
 Schafer, H. (501) (Misc.)
 Schapiro, S. L., with Brussin, 590 (R.I.)
 Scharff, J. W., (158) (Mal.)
 Schauder, H., 594 (R.F.)
 van Schevensteen, A. F. C., 179 (Hist.)
 Schewelega, E. M., with Wolski, 563 (Mal.)
 Schewtschenko, F. I., with Chodukin, 76 (K.A.)
 Schiassi, F. & Merighi, G., 565 (Mal.)
 Schichlajewa, S., with Roskin, 361 (S.S.)
 Schijveschuurder, W., 470 (Hel.)
 Schilling, C., 169 (Myc.), 368 (Misc.), 717 (Z.)
 Schilling, V. & San Martin A., 838 (Z.)
 Schischlaiewa, S., with Roskin, 725 (Z.)
 Schlirf, C., 491 (Misc.)
 Schlossberger, H., 659 (Y. & S.)
 — & Wichmann, F. W., 235 (Dys.)
 Schmidt-Weyland, P., with Glusmann, 711 (Rab.)
 Schnitzer, R. & Silberstein, W., 347 (S.S.)
 Schnürer, J., 196 (Rab.)
 Schöbl, O., 6, 657, 662, (Y. & S.)
 Schockaert, J., 600, 601 (Fev.)
 Schoen, R., with Levaditi, 720 (Z.)
 Schofield, A. T., 598 (R.F.)
 Schönhöfer, F., with Schulemann & Wingler, 568 (Mal.)
 Schott, A., with Feldt, 405 (Misc.)
 Schuberg, A., 326 (B.R.)
 Schüffner, W., 547 (Y.F.)
 —, Mochtar, A., Proehoeman, S. & Honig, L., 544 (Y.F.)
 — & Sieburgh, G., 110 (Jaun.)
 Schüffner, W. A. P., 605 (Jaun.)
 Schule, P. A., 261 (Z.)
 Schulemann, W., Schönhöfer, F. & Wingler, A., 568 (Mal.)

- Schulmann, E., with Loeper & Lemaire, 610 (Jaun.)
 Schulze, F. O., with Kroó, 494 (Misc.)
 Schut, J., 673 (Pl.)
 Schuurman, C. J. & Huinink, A. S. T. B., 919 (Misc.)
 Schuurmans Stekhoven, Jr., J. H., 966 (Hel.)
 Schwartz, B., 468 (Hel.)
 Schwartzmann, A. I., 156 (Mal.)
 Schweizer, A., 165 (Myc.)
 Schwetz, 266, 284 (Z.)
 Schwetz, J., 118 (Mal.), 408 (Misc.)
 Scott, H., 266 (Z.)
 Scott, J. A., 968 (Hel.)
 Scott, L. C. & Herrmann, G. R., 867 (Ib.)
 Scott, R. W. & Saphir, O., 508 (Und.)
 Scriabine, K. I., (974) (Hel.)
 Scrimaglio, E. F., 461 (Hel.)
 Sdrodowski, P., 40 (Und.), 718 (Z.)
 Seagar, 550 (Mal.)
 Seale, E. A., 480 (Oph.)
 Sebenzow, B. M. & Adowa, A. N., 815 (Z.)
 Sebsnzow, with Adova, 270 (Z.)
 Sedan, J., 994 (Oph.)
 Seibert, F. M., 222 (Am.)
 Seiffert, W., with Uhlenhuth, 609 (Jaun.)
 Selgman, with Labbé & Lomon, 954 (Hel.)
 Sella, M., 915 (Misc.)
 —, with La Face, 578 (Mal.)
 Sellards, A. W., 105 (Jaun.), 548 (Y.F.)
 —, with Gay, D. M., 104 (Jaun.)
 — & Hindle, E., 539 (Y.F.)
 —, with Mathis & Laigret, 538 (Y.F.)
 — & Theiler, M., 543 (Y.F.)
 Selwyn-Clarke, P. S., 5 (Y. & S.), 540 (Y.F.)
 Semikoz, T., 320 (Pl.)
 —, with Bezsonova & Kotelnikov, 674 (Pl.)
 Sen, A. N., 421 (K.A.)
 Sen, P. B., with Brahmachari, 500 (Misc.)
 Senevet, G. & Champagne, R., 940 (Hel.)
 — & Prunelle, M., 818 *bis* (Z.)
 — with Sergeant, Edm. & Et. & Catanei, 552 (Mal.)
 Senior-White, R., 553 (Mal.), 805 (Z.) 891 (Bl.)
 —, with Knowles, 583 (B.R.), (158) (Mal.)
 Séno, R., 38 (Der.)
 Sepulcri, P., 269 (Z.), 573 (Mal.)
 Sequeira, J. H., 14 (G.V.)
 Sergeant, E., 296 (Lab.)
 Sergeant, Ed. & Et. & Catanei, A., 727 (Z.)
 —, — & Senevet, G., 552 (Mal.)
 Severinghaus, A. E., 949 (Hel.)
 Severn, A. G. M., 178 (Hist.), (501) (Misc.)
 — & Evans, E. W., 625 (Dys.)
 Seyfarth, C., 391 (Misc.)
 Štarić, 571 (Mal.)
 Shaha, B., (162) (Bl.)
 Shakhov, S., (738) (Z.)
 Shamsher Jang, with Naidu, 320 (Pl.)
 Shannon, R. C. & Davis, N. C., 817 (Z.)
 —, with —, 819 (Z.)
 —, — & del Ponte, E., 816 (Z.)
 — & del Ponte, E., 125 (Mal.), 820, 825 (Z.)
 Shapshev, K. N., with Popov, 128 (Mal.)
 Sharp, L. E. S., 646 (Lep.)
 Sharp, N. A. D., 4 (Y. & S.) 472 *bis*, 473 *bis* (Hel.), (501) (Misc.), 648 (Lep.)
 Shattuck, G. C., 381 (Misc.)
 — & Willis, P. T., 947 (Hel.)
 Shaw, F. W., 22 (Myc.)
 Shelton, C. F., 174 (Hist.)
 Shimoda, T., with Abe, 600 (Fev.)
 Shinn, H. L., 33 (Der.)
 Shiraogawa, H., with Hirano, 238 (Dys.)
 Shurcore, J. O., 787 (S.S.)
 Shore, C. A., 715 (Rab.)
 Shortt, H. E., 61 (K.A.)
 —, Das, S. & Lal, C., 419 (K.A.)
 — & Swaminath, C. S., 265 (Z.), 422 (K.A.)
 Shrivastava, D. L., with Hughes, 395, 415 (Misc.)
 Shropshire, J. B. & Zetek, J., 271 (Z.)
 Shute, P. G., with James & Nicol, 573 (Mal.)
 Sica, E., 747 (Myc.)
 Sicé, A., 396 (Misc.)
 Sidlick, D. M., 15 (G.V.)
 Sieburgh, G., with Schöffner, 110 (Jaun.)
 Silberstein, W., 348 (S.S.)
 —, with Schnitzer, 347 (S.S.)
 Silverman, D. N., 686 (Sp.)
 Simon, I., 143 (Mal.)
 Simpson, W., with Klotz, 112 *bis* (Y.F.)
 Sinelnikov, A. M., 449 (Hel.)
 Singh, Z., with Hodgson & Vardon, 413 (Misc.)
 Sinnatamby, G. S., 702 (Der.)
 Sinton, J. A., 140 (Mal.), 285, 824 (Z.), 421 (K.A.)
 —, Bird, W. & Eate, S. N., 140 (Mal.)
 —, with Christophers & Covell, 267 (Z.)
 — & Covell, G., 271 (Z.)
 Sioe, K. T., 454 (Hel.)
 Sirca, A. (579) (Mal.)
 Sison, A. B. M. & Ignacio, M., 496 (Misc.)
 Sitanela, J. B., 639 (Lep.)
 Sitsen, A. E. (501) (Misc.)
 Sivasambandan, R., 961 (Hel.)
 Skelton, D. S., Malcolm, J. W. & Lloyd, R., 244 (Dys.)
 Skvorzowa, E. D., 724 (Z.)
 Slanetz, C. A., with McAlpine, 517 (Und.)
 Shwensky, M., 121, 136 (Mal.)
 van Slooten, J., with Brug, 278 (Z.)
 de Smidt, F., 321 (Pl.)
 de Smidt, F. P. G., 22 (Myc.), 674, 675 (Pl.)
 Smurnov, G. & Glasunov, M., 959 (Hel.)
 Smirnova, E. I., 675 (Pl.)
 Smith, C. E. & Rusk, G. Y., 96 (R.F.)
 Smith, D. C., with Sanderson, 746 (Myc.)
 Smith, E. C., 28 (Der.), 748 (Myc.), 978 (Lep.)
 Smith, E. E., 888 (H.S.)
 Smith, E. F. (501) (Misc.)
 Smith, G. D., with Baumgartner, 56 (Sp.)
 Smith, H., 756 (B.R.)
 Smith, S. C., 256, 721, 722 (Z.)
 Smits, E., with Baermann, 604, 605 (Jaun.)
 Smorodinzew, J. A. & Adowa, A. N., 814 (Z.)
 Smyly, H. J., 63 (K.A.)
 Snijders, E. P., 400, 1000 (Misc.), 543 (Y.F.)
 Snodgrass, W. R., with Browning, Cohen, Gulbransen & Phillis, 94 (R.F.)
 Sobhy, M., 947 (Hel.) 990 (Oph.)
 Soesilo, R., with Walch, 554 (Mal.)
 Soetedjo with Sampoerno, 398 (Misc.)
 Sokhey, S. S., Gokhale, S. K., Malandkar, M. A. & Billimoria, H. S., 688 (Sp.)
 — & Malandkar, M. A., 686 (Sp.)

Solovieuf, N., 469 (Hel.)
 Solowjowa, J., with Glusmann, 710 (Rab.)
 Songkla, M., with McGavran, 951 (Hel.)
 Sonobe, K., 289 (Z.)
 Sordelli, A. & Facella, G., 292 (Z.)
 Sorel, F., 847 *bis* (Y.F.)
 Sorge, G., 839 (Z.)
 Souchard, L., 987 (Lep.)
 Soudakoff, P. S., 480 (Oph.)
 South African Institute for Medical Research,
 906 (Lab.)
 South African Red Cross Society (Transvaal)
 & Union Department of Public Health,
 572 (Mal.)
 Speranza, U., 142 (Mal.)
 Spillmann, 976 (Lep.)
 —, Kissel, P. & Florentin, P., 981 (Lep.)
 Squires, H. C., 567 (Mal.)
 Ssinjuschina, M., with Lebedjeva, 89 (R.F.)
 Ssutin, J., with Elbert & Jowelew, 196 (Rab.)
 Stabile de Nucci, L., with Bruchmann, 245
 (Dys.)
 Sta. Cruz, J. Z., 392 (Misc.)
 Stankoff, A. G., (974) (Hel.)
 Stannus, H. S., 655 (Y. & S.)
 Stanton, A., 363 (Misc.)
 — & Fletcher, W., 382 (Misc.)
 —, — & Symonds, S. L., 382 (Misc.)
 Stawell, R. R., 462 (Hel.)
 Steel, C. R., (664) (Y. & S.)
 van Steenis, P. B., 221, 224 (Am.)
 Stefanopoulo, G., with Pettit, 850 (Y.F.)
 —, with — & Aguessy, 850 (Y.F.)
 —, with — & Frasey, 851 (Y.F.)
 —, with — & Kolochine, 851 (Y.F.)
 —, with Sazerac & Hosoya, 101 (Jaun.)
 Stefanopoulo, G. J., with Hosoya, 608 (Jaun.)
 Stein, A. K., with Pavlowsky, 287 (Z.)
 —, with Pavlowsky, 288, 834 (Z.)
 Steiner, G. & Steinfeld, J., 92 (R.F.)
 Steiner, L., 8 (Y. & S.)
 Steinfeld, J., with Steiner, 92 (R.F.)
 Stephens, G. A., 874 (Bb.)
 Stephens, J. W. W., 890 *bis* (Bl.)
 — & Owen, D. U., 149 (Mal.)
 Stewart, A. D., 552 (Mal.), 733 (Z.)
 Stewart, Jr., T. H., with McNabb, 569 (Mal.)
 Stewart, W. B., 388 (Misc.)
 Stiles, C. W., 251 (Z.)
 Still, R. M. L., 561 (Mal.)
 Stitt, E. R., 168 (B.R.)
 Stodel, G., with Gaujoux, 599 (R.F.)
 Stokes, A., Bauer, J. H. & Hudson, N. P.,
 537, 538 (Y.F.)
 Stovarsol, Scientific Papers on, 584 (B.R.)
 Straits Settlements, 208 (Lep.)
 Strathairn, G. C., 542 (Y.F.)
 Strempel, R., 594 (R.F.)
 Strickland, C. & Chowdhury, K. L., 267 (Z.)
 Strom, J., 456 (Hel.)
 Stroud, R. J., 282 (Z.)
 Struthers, E. B., 423 (K.A.)
 Stuart, G., 907 (Lab.)
 Stuart, M. A., 153 (Mal.), 615 (Am.)
 Suárez, P. A., 671 (Pl.)
 Suda, K., 950 (Hel.)
 Suldey, E. W., 279 (Z.)
 Sundararajan, E. R., with Russell, (684) (Chl.)
 Sutherland, G. A., 873 (Bb.)
 Suzuki, K., 237 (Dys.)

Swaminath, C. S., with Shortt, 265 (Z.) 422
 (K.A.)
 Swellengrebel, N. H., 555 (Mal.)
 — & de Rook, H., 816, 820 (Z.) 915 (Misc.)
 —, with —, 919 (Misc.)
 Sydenstricker, E., with Goldberger, 439 (Pel.)
 Symes, C. B., 819 (Z.)
 Symonds, S. L., with Stanton & Fletcher,
 382 (Misc.)

T

Takagi, S., 610 (Jaun.)
 —, with Tanaka, 55 (Fev.)
 Takahashi, S., 453, 940, 950 (Hel.)
 —, with Hachiya, 679 (Chl.)
 —, with Miyairi, 52 (Fev.)
 Takaishi, T., 958 (Hel.)
 Takano, R., 938 (Hel.)
 —, Ohtsubo, I. & Inouye, Z. (684) (Chl.)
 Takano, S., 941 (Hel.)
 Takasugi, S., 2 (Y. & S.)
 Takaya, J., 708, 710 *bis* (Rab.)
 Takizawa, T., with Kanda, 991 (Oph.)
 Taliaferro, L. G., with Taliaferro W. H. &
 Fisher, 149 (Mal.)
 Taliaferro, W. H., with Cannon & Dragstedt,
 836 (Z.)
 —, with Coventry, 937 (Hel.)
 —, Taliaferro, L. G. & Fisher, A. B., 149
 (Mal.)
 Tálíce, R. V., 740 (Myc.)
 Tanaka, H. & Takagi, S., 55 (Fev.)
 Tanganyika Territory, 658, 842 (Y. & S.)
 —, Ann. Rep. Bact. Lab., 294 (Lab.)
 Tanner, F. W., with Wallace, 22 (Myc.)
 Tao, S. M., 280 (Z.)
 Tate, D. L., 130 (Mal.)
 Taylor, J., Martin, C. de C. & Thant, U., 866
 (Bb.)
 Tchechkoff, A., with Ponomareff, 191 (Rab.)
 Tchechkow, A. M., 709 (Rab.)
 —, with Ponomarew, 709 (Rab.)
 Teodosiu, T., with Jonnesco & Valter, 191
 (Rab.)
 Thakur, H. L. S. L., with Brahmachari, 435
 (Bb.)
 Thant, U., with Taylor & Martin, 866 (Bb.)
 Thaysen, 685 (Sp.)
 Theiler, M., with Sellards, 543 (Y.F.)
 Theodor, O., with Adler, 65, 75, 428 (K.A.)
 Theodore, J. H., 403 (Misc.)
 van Thiel, P. H., 108 (Jaun.) 468 (Hel.), 821
 (Z.)
 Thierfelder, M. U., 668 (G.V.)
 Thierfelder-Thillot, M., 430 (Bb.)
 Thillot, M. T., 17 (G.V.)
 Thomas, G. C., 194, 715 (Rab.)
 Thomson, (313) (Chl.)
 Thomson, J. G., 575 (Mal.)
 —, with Hindle, 859 (K.A.)
 Thomson, J. H., 457 (Hel.)
 Thorne, G. W., with Hein & McCalla, 388,
 (Misc.)
 Thrower, R., 889 (H.S.)
 Tilmant, J., (927) (Misc.)
 Tiprez, J. & Moulin, H., 936 (Hel.)
 Tirrill, Jr., W. O., with Jones, 651 (Lep.)
 Tisseuil, J., 935 (Hel.)

- Tixier, L., Favre, M., Morenas, E. & Petouraud, C., 217 (Am.)
 Todd, K. W., with Chesterman, 342 (S.S.), 659 (Y. & S.)
 Todd, M. L., 14 (Und.), 702 (Der.)
 Tohtaro, K., with Ando, 453 (Hel.)
 Tomb, J. W., 313, (313), (684) (Chl.)
 Tootell, G. T., 458 (Hel.)
 Tornabuoni, G., with Lombardo, 13 (Y. & S.)
 Torrademé, 77 (K.A.)
 Torres, C. M., 386 (Misc.), 719 *ter* (Z.), 741 (Myc.)
 — & de Azevedo, A. P., 132 (Mal.)
 Torres, O., 201 (Lep.)
 Touraine, with Babonneix & Widiez, 203 (Lep.)
 Tournier, E., (684) (Chl.)
 Towler, H. H. & Walker, J. E., 99 (Jaun.)
 Toyoda, K., 449 (Hel.)
 Trabadoros, A. G., 892 (Bl.)
 Traubaud, 620 (Am.), 877 (Bb.)
 Trachoniotovsky, 122 (Mal.)
 Transactions of the Royal Society of Tropical Medicine and Hygiene, 302, 908 (Lab.) 363 (Misc.)
 Trapezontzewa, C., 991 (Oph.)
 Trapezontzewa, C., 477 (Oph.)
 Trensz, F., with Nessmann, 946 (Hel.)
 Treston, M. L., 401 (Misc.)
 Troisic, J., with Deschiens & Limousin, 265 (Z.)
 Troisier, P., Deschiens, R., Limousin, H. & Delorme, M., 963 (Hel.)
 Trolli, G., 794 (S.S.)
 Tropp, G., with Kikuth, 577 (Mal.)
 Tsakalotos, A. E. & Choremis, K., 562 (Mal.)
 Tsuyuki, K., 958 (Hel.)
 Tsvétaeff, A. A., (974) (Hel.)
 Tullio, P., with Albertoni, 441 (Pel.)
 Turkhud, D. A., 299 (Lab.)
 Tutunji, D. F. (501) (Misc.)

U

- Uganda Protectorate, 295, 905 (Lab.)
 Uhlenhuth & Seiffert, W., 609 (Jaun.)
 Underhill, F. P. & Mendel, L. B., 885 (Pel.)
 United Fruit Company, Boston, Mass., 134 (Mal.) 160 (Bl.)
 United States Naval Medical Bulletin, 120 (Mal.), 190 (Rab.)
 Unna, Jr., P., 643 (Lep.)
 Urchs, O., 131, 570 (Mal.)

V

- Vaccarezza, R. F., with Destefano, 667 (C.Bu.)
 Vad, B. G. & Mohile, G. B., 137 (Mal.)
 Valenti, E., 45 (Und.)
 Vallée, H., 706 (Rab.)
 —, with Marie & Remlinger, 706 (Rab.)
 Valter, B., with Ionesco, 191 (Rab.)
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SCIENTIFIC PERIODICALS

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EUROPE.

GREAT BRITAIN.

<i>*Annals of Applied Biology (London)</i>	1914—	Vol.	1—	
<i>*Annals of Eugenics (Cambridge)</i>	1926—	Vol.	1—	
<i>Annals of the Pickett-Thomson Research Laboratory (London)</i>	1924—	Vol.	1—	
<i>Annals of Tropical Medicine & Parasitology (Liverpool)</i>	1907—	Vol.	1—	
<i>Archives of Disease in Childhood (London)</i>	1926—	Vol.	1—	
<i>*Archives of Medical Hydrlogy (London)</i>	1922—	Vol.	1—	
Better Health (London)	1927—	Vol.	1—	No. 2—
*Biochemical Journal (London)	1923—	Vol.	17—	
British Dental Journal (London)	1926—	Vol.	47—	
British Journal of Actinotherapy (London)	1927—	Vol.	2—	No. 4—
[British Journal of Dermatology & Syphilis (London)]	1925—	Vol.	37—	No. 7— Vol. 40.
<i>British Journal of Experimental Pathology (London)</i>	1920—	Vol.	1—	
British Journal of Inebriety (Alcoholism & Drug Addiction) (London)	1926—	Vol.	23—	No. 3—
[British Journal of Ophthalmology (London)]	1917—23	Vols.	1—7]	
British Journal of Tuberculosis (London)	1925—	Vol.	19—	No. 3—
*British Journal of Venereal Diseases (London)	1925—	Vol.	1—	
British Medical Journal (London)	1876—			
<i>Bulletin of Entomological Research (London)</i>	1910—	Vol.	1—	
<i>Bulletin of Hygiene (London)</i>	1926—	Vol.	1—	
<i>Bulletin of the International Institute of Sanitary & Municipal Engineers (London)</i>	1925—			No. 1—
Cancer Review (Bristol)	1926—	Vol.	1—	
Domestic Engineering, Heat & Ventilation (London)	1926—	Vol.	46	No. 2—
Ectoparasites (London)	1921.	Vol.	1.	
Edinburgh Medical Journal (Edinburgh)	1908—	(New Ser.)	Vol 1—	
Eugenics Review (London)	1926—	Vol.	18—	
*Franco-British Medical Review (London)	1927—	Vol.	4—	
Garden Cities and Town Planning (London)	1927—	Dec.—		
*Glasgow Health Bulletin	1924—	Vol.	1—	
Glasgow Medical Journal (Glasgow)	1909—	Vol.	71—	
Health and Empire (London)	1928—	Vol.	3—	No. 1—
Illuminating Engineer (London)	1926—	Vol.	19—	
Industrial Welfare (London)	1926—	Vol.	8—	
*Journal of the African Society (London)	1925—	Vol.	25—	
Journal of Comparative Pathology & Therapeutics (London)	1908—	Vol.	21—	
*Journal of Genetics (London)	1927—	Vol.	19—	
<i>Journal of Helminthology (London)</i>	1923—	Vol.	1—	
<i>Journal of Hygiene (Cambridge)</i>	1901—	Vol.	1—	
Journal of the Institution of Sanitary Engineers (London)	1925—	Vol.	29—	Pt. 4—
<i>Journal of the London School of Tropical Medicine (London)</i>	1911—13	Vols.	1—2	

GREAT BRITAIN—cont.

Journal of Mental Science (London)	1926—	Vol.	72—	
Journal of the Ministry of Agriculture (London) ...	1913—	Vol.	20—	
Journal of the National Institute of Industrial Psychology (London)	1925—	Vol.	2	No. 5—
Journal of Obstetrics and Gynaecology of the British Empire (Manchester)	1927—	Vol.	34—	
Journal of Pathology & Bacteriology (Cambridge and Edinburgh)	1892—	Vol.	1—	
Journal of the Royal Army Medical Corps (London)	1903—	Vol.	1—	
Journal of the Royal Naval Medical Service (London)	1915—	Vol.	1—	
Journal of the Royal Sanitary Institute (London)...	1922—	Vol.	42—	
Journal of School Hygiene and Physical Education (Birmingham)	1925—	Vol.	15	No. 52—
Journal of State Medicine (London)	1913—	Vol.	21—	
Journal of the Town Planning Institute (London)...	1925—	Vol.	12—	
Journal of Tropical Medicine & Hygiene (London)...	1898—	Vol.	1—	
Kala Azar Bulletin (London)	1911-12			Nos. 1-3
*Laboratory Journal (Weybridge)	1924—	Vol.	6—	
Lancet (London)	1824-42	[Incomplete]	1843 -	
Lister Institute. Collected Papers (London) ...	1904—	Vol.	1—	
London School of Tropical Medicine. Collected Papers—				
(a) Clinical & Pathological Papers	1922—	Part	1—	
(b) Papers from the Department of Helminthology	1922—	Part	1—	
*Medical Annual (Bristol)	1905	Vol.	23	
	1914	Vol.	32	
	1921—	Vol.	39—	
	1925—	Vol.	34	
Medical Officer (London)	1919-25	Vols.	1-12	
Medical Science. Abstracts and Reviews (London)...	1921—	Vol.	108—	
Nature (London)	1908—	Vol.	1—	
Parasitology (Cambridge)				
[*Philosophical Transactions of the Royal Society (Series B) (London)	1900-18	Vols.	193-208]	
[Physiological Abstracts (London)	1922-23	Vol.	7	
	1926-27	Vol.	11.]	
*Post Graduate Medical Journal (London)	1925—	Vol.	1—	
Prescriber (Edinburgh)	1926—	Vol.	20—	
Proceedings of the Royal Society, Series B. (London)	1905—	Vol.	76—	
Protozoology. Supplement to the Journal of Helminthology (London)	1925—			No. 1—
Proceedings of the Royal Society of Medicine (London)	1921—	Vol.	15—	
Public Health (London)	1908—	Vol.	22—	
Quarterly Journal of Pharmacy (London)	1928—	Vol.	1—	
Review of Applied Entomology. Series A.: Agricultural. Series B.: Medical & Veterinary (London)	1913—	Vol.	1—	
Review of Applied Mycology (Kew)	1922—	Vol.	1—	
Scottish Journal of Agriculture (Edinburgh) ...	1926—	Vol.	9—	
Sleeping Sickness Bulletin (London)	1908-12	Vols.	1-4	
Surveyor & Municipal & County Engineer (London)	1922—	Vol.	62—	
Transactions of the Royal Society of Tropical Medicine & Hygiene (London)	1907—	Vol.	1—	
Tropical Diseases Bulletin (London)	1912—	Vol.	1—	
Tropical Veterinary Bulletin (London)	1913—	Vol.	1—	
Tubercle (London)	1925—	Vol.	7—	
United Empire (London)	1926—	Vol.	17—	
Veterinary Journal (London)	1909—	Vol.	65—	
[Veterinary News (London)	1810-21	Vol.	7-18]	
Veterinary Record (London)	1912—	Vol.	25—	
Yellow Fever Bureau Bulletin (Liverpool) ...	1911-15	Vols	1-3	
*Zoological Record (London)	1920—	Vol.	57—	

IRELAND.

[Department of Agriculture & Technical Instruction
for Ireland Journal (Dublin)

Irish Journal of Medical Science (Dublin)

1901-23 Vol. 2-23]

1926— 6 ser.

No. 1—

AUSTRIA.

<i>Mitteilungen des Volksgesundheitsamtes im Bundesministerium für soziale Verwaltung (Vienna)</i> ...	1920—	No. 1—
<i>Seuchenbekämpfung (Vienna)</i> ...	1924—	Vol. 1—
<i>Wiener Klinische Wochenschrift (Vienna)</i> ...	1913—	Vol. 26—
<i>[Wiener Medizinische Wochenschrift (Vienna)]</i> ...	1927-28	Vol. 77-78]

BELGIUM.

<i>[Annales de Médecine Vétérinaire (Ixelles-Brussels)]</i>	1913-19	Vol. 62-84]
<i>Annales de la Société Belge de Médecine Tropicale (Brussels)</i> ...	1920—	Vol. 1—
<i>Archives Médicales Belges (Brussels)</i> ...	1917—	Vol. 70—
<i>Bruxelles-Médical (Brussels)</i> ...	1922—	Vol. 3—
<i>[Bulletin de l'Académie Royale de Médecine de Belgique (Brussels)]</i> ...	1908-19 (4 ser.)	Vol. 22-29]
<i>Bulletin Agricole du Congo Belge (Brussels)</i> ...	1915—	Vol. 6—
<i>Bulletin International de la Protection de l'Enfance (Brussels)</i> ...	1923—	No. 18—
* <i>Bulletin mensuel de statistique démographique et médicale . . . de la Ville de Bruxelles</i> ...	1928—	Vol. 59—
<i>[Etudes de Biologie Agricole (London)]</i> ...	1915-16	Nos. 1, 2, 4]

CZECHO-SLOVAKIA.

<i>Casopis pro Zdravotnictvo (Bratislava)</i> ...	1928—	Vol. 19—
<i>Prager Archiv für Tiermedizin und vergleichende Pathologie, Teil A (Prague)</i> ...	1927—	Vol. 7—

DENMARK.

<i>Acta Pathologica et Microbiologica Scandinavica (Copenhagen)</i> ...	1927—	Vol. 4—
<i>Hospitalstidende (Copenhagen)</i> ...	1921—	Vol. 64—

FRANCE.

<i>Annales d'Hygiène Publique, Industrielle et Sociale (Paris)</i> ...	1923—	(New Ser.) Vol. 1—
<i>Annales de l'Institut Pasteur (Paris)</i> ...	1897—	Vol. 11—
* <i>Annales de Médecine (Paris)</i> ...	1920—	Vol. 7—
<i>Annales de Médecine et de Pharmacie Coloniales [formerly Annales d'Hygiène et de Médecine Coloniales (Paris)]</i> ...	1898—	Vol. 1—
<i>Annales de Parasitologie Humaine et Comparée (Paris)</i> ...	1923—	Vol. 1—
<i>Archives de Médecine et de Pharmacie Militaire (Paris)</i> ...	1914—	Vol. 63—
<i>Archives de Médecine et Pharmacie Navales (Paris)</i>	1907—	Vol. 88—
<i>Archives de Parasitologie (Paris)</i> ...	1898-1919	Vols. 1-16
<i>Archives Roumaines de Pathologie Expérimentale et de Microbiologie (Paris)</i> ...	1928—	Vol. 1—
* <i>Bulletin de l'Académie de Médecine (Paris)</i> ...	1917-22	Vols. 77-88
	1923—	Vol. 90—
<i>Bulletin de l'Académie Vétérinaire de France (Paris)</i>	1928—	Vol. 1—
<i>Bulletin de l'Institut Pasteur (Paris)</i> ...	1903—	Vol. 1—
<i>Bulletin de l'Office International d'Hygiène Publique (Paris)</i> ...	1909—	Vol. 1—
<i>Bulletin de la Société de Pathologie Exotique (Paris)</i>	1908—	Vol. 1—
<i>Bulletin de la Société Scientifique d'Hygiène Alimentaire (Paris)</i> ...	1927—	Vol. 15—
<i>Bulletins et Mémoires de la Société Médicale des Hôpitaux de Paris (Paris)</i> ...	1913—	(3 ser.) Vol. 29—
<i>[Caducée (Paris)]</i> ...	1913-19	Vol. 13-19]
* <i>Comptes Rendus de l'Académie des Sciences (Paris)</i>	1910—	Vol. 150—
<i>Comptes Rendus de la Société de Biologie (Paris)</i> ...	1903—	Vol. 55—
<i>Gazette des Hôpitaux Civils et Militaires (Paris)</i> ...	1913—	[Vol. 86 incomplete]
<i>L'Hygiène par l'exemple (Paris)</i> ...	1928—	Vol. 7— No. 1—
<i>Journal de Médecine de Bordeaux et de la Région du Sud-Ouest (Bordeaux)</i> ...	1923—	Vol. 95—
* <i>Journal de physiologie et de pathologie générale (Paris)</i> ...	1919—	Vol. 18—

FRANCE—cont.

Medical Bulletin (Paris), see *War Medicine*.

Le Mouvement Sanitaire (Paris)	1927—	Vol.	3—	No. 38—
Presse Médicale (Paris)	1915.	Vol.	23.	
	1917—	Vol.	25—	

Recueil de Médecine Vétérinaire de l'Ecole d'Alfort (Paris) (1909 Vol. 86.) 1913— Vol. 90—

Recueil de Médecine Vétérinaire Exotique de l'Ecole d'Alfort (Paris) 1928— Vol. 1—

Revue d'Hygiène et de Médecine Préventive (Paris) 1925— Vol. 47—

Revue de Médecine et d'Hygiène Tropicales (Paris) ... 1904— Vol. 1—

Revue de Pathologie Comparée et d'Hygiène Générale (Paris) 1917— Vol. 17—

Revue Internationale du Trachome (Paris) 1924— Vol. 1—

Revue Générale de Médecine Vétérinaire (Toulouse) 1913— Vol. 21—

Revue Pratique des Maladies des Pays Chauds (Paris) 1922— Vol. 1—

Revue Vétérinaire et Journal de Médecine Vétérinaire et de Zootechnie (Toulouse) 1913— Vol. 38—

[*War Medicine* (Paris) formerly *Medical Bulletin* ... 1917-18 Vol. 1-2]

World's Health (Paris) 1926— Vol. 7, No. 4—

GERMANY.

Arbeiten aus dem Reichsgesundheitsamte (Berlin) ... 1913— Vol. 43—

Archiv für Dermatologie und Syphilis (Berlin) ... 1926— Vol. 152—

[Archiv für experimentelle Pathologie und Pharmakologie (Leipzig) 1926-27 Vols. 118-121]

Archiv für Hygiene (Munich & Berlin) 1927— Vol. 98—

Archiv für Protistenkunde (Jena) 1902— Vol. 1—

Archiv für Schiffs- und Tropen-Hygiene [6 Beihefte] (Leipzig) 1897— Vol. 1—

Archiv für soziale Hygiene und Demographie (Berlin-Charlottenburg) 1925— n.s. Vol. 1—

Archiv für Wissenschaftliche und Praktische Tierheilkunde (Berlin) 1912— Vol. 39—

Berliner Tierärztliche Wochenschrift 1914— Vol. 30— [Incomplete]

[Biochemische Zeitschrift (Berlin) 1926-27 Vol. 179-182]

*Centralblatt für Bakteriologie (Jena)

1. Abteilung. Originale 1887— Vol. 1—

*Do. *1. Abteilung. Referate 1902— Vol. 31—

*Do. 2. Abteilung 1895— Vol. 1—

Deutsche Medizinische Wochenschrift (Berlin) ... 1909— Vol. 35—

Deutsche Tierärztliche Wochenschrift (Hanover) ... 1924— Vol. 32—

*Ergebnisse der Hygiene, Bakteriologie 1914— Vol. 1—

[Gesundheits-Ingenieur (Munich) 1927— Vol. 50—]

Klinische Wochenschrift (Berlin) 1924— Vol. 3—

[Lepra (Leipzig) 1913-17 Vol. 14-15]

*Medizinalstatistische Nachrichten . . . vom Preussischen Stat. Landesamt (Berlin) 1909— Vol. 1—

Medizinische Klinik (Berlin) 1924— Vol. 20—

Mitteilungen d. Tierseuchenstelle d. Thüringischen Landesanstalt f. Viehversicherung 1922— Vol. 2—

*Mitteilungen aus dem Zoologischen Museum in Berlin 1910— Vol. 5—

Münchener Medizinische Wochenschrift (Munich) ... 1914— Vol. 61—

Reichsgesundheitsblatt (Berlin) 1926— Vol. 1—

*Statistische Monatsberichte der Stadt Leipzig ... 1927— Vol. 19—

Strahlentherapie (Berlin) 1926— Vol. 24-27]

Therapeutische Monatshefte für Veterinärmedizin (Hoechst) 1927— Vol. 1—

*Zeitschrift für angewandte Entomologie (Berlin) ... 1914— Vol. 1—

Zeitschrift für Fleisch- und Milch-hygiene (Berlin) ... 1926— Vol. 37—

Zeitschrift für Hygiene und Infektionskrankheiten (Leipzig) 1912— Vol. 72—

Zeitschrift für Infektionskrankheiten parasitäre Krankheiten und Hygiene der Haustiere (Berlin) 1917-20 Vol. 18-20

1922— Vol. 24—

Zeitschrift für Immunitätsforschung und Experimentelle Therapie (Jena) Originale 1908— Vol. 1—

*Zeitschrift für Parasitenkunde (Berlin) 1928— Vol. 1—

GERMANY—cont.

Zeitschrift für Tuberculose (Leipzig)	1927—	Vol.	47—
Zentralblatt für die gesamte Hygiene und ihre Grenzgebiete (Berlin)	1926—	Vol.	13—16]
Zentralblatt für Gewerbehygiene und Unfallverhütung (neue folge) (Berlin)	1927—	Vol.	4—

GREECE.

<i>Archives de l'Institut Pasteur Hellenique (Athens)</i>	1923—	Vol.	1—
Grèce Médicale & Ἱατρικὴ Ἱστορία (Athens)	1912—	Vol.	14—
			[Incomplete]

HOLLAND.

<i>Acta Leidensia, Scholae Medicinae Tropicae (Leyden)</i>	1926—	Vol.	1—
<i>Folia Microbiologica (Delft)</i>	1912—19	Vols.	1—4
Janus (Leyden)	1909—	Vol.	14—
<i>Mededeelingen van het Kolonial Instituut, Afdeling Tropische Hygiene (Amsterdam)</i>	1914—	Vol.	1—
Nederlandsch Tijdschrift voor Geneeskunde (Amsterdam)	1924—	Vol.	68—
Nederlandsch Tijdschrift voor Hygiene, Microbiologie en Serologie (Leyden)	1927—	Vol.	2—
Tijdschrift voor Diergeneeskunde (Utrecht)	1920—	Vols.	47—
[Tijdschrift voor Vergelijkende Geneeskunde, enz. (Leyden)	1922—25	Vols.	7—11]

HUNGARY.

*Magyar orvosi archivum (Budapest)	1925—	Vol.	26—
*Orvosi hetilap (Budapest)	1925—	Vol.	69—

ITALY.

Annali d'Igiene [formerly Annali d'Igiene Sperimentale] (Rome)	1912—	Vol.	22—
Annali di Medicina Navale e Coloniale (Rome)	1908—	Anno	14—
Archivio di Farmacologia Sperimentale e Scienze affini. (Rome)	1918—	Vol.	26—
[Annali della Stazione Sperimentale per le Malattie Infettive del Bestiame (Naples)	1911—13	Vol.	1—2]
Biochimica e Terapia Sperimentale (Milan)	1926—	Vol.	13—
Bollettino dell' Istituto Sieroterapico Milanese (Milan)	1917—	Vol.	1—
*Bollettino mensile di statistica dell' Istituto centrale di statistica del Regno d'Italia (Rome)	1928—	Vol.	3— No 7—
Bollettino della Società Medico Chirurgica di Modena (Modena)	1914—	Vol.	16—
			[Incomplete]
Clinica Veterinaria (Milan)	1913—	Vol.	36—
* <i>Giornale di batteriologia e immunologia (Turin)</i>	1926—	Vol.	1—
<i>Giornale di Clinica Medica (Parma)</i>	1920—	Vol.	1—
[Giornale di Medicina Militare (Rome)	1914—22	Vols.	62—70]
Giornale della R. Accademia di Medicina di Torino (Turin)	1912—	Vol.	75—
[Giornale della Reale Società Italiana d'Igiene (Milan)	1913—19	Vol.	35—41]
			[Incomplete]
Haematologica (Pavia)	1922—	Vol.	3—
International Review of Agriculture (Rome)	1920—	Vol.	11—
[Malaria e Malattie dei Paesi Caldi (Rome)	1910—17	Vols.	1—8 [Vols. 1—3 incomplete]
[Maliologia [formerly Propaganda Anti-malarica] (Naples)	1911—21	Vol.	4—14]
<i>Maternità ed Infanzia (Rome)</i>	1926—	Vol.	1—
Moderno Zooiatro (Bologna)			
Parte professionale	1913—	Vol.	2—
Parte scientifica	1913—	Vol.	2—
Nipologia (Naples)	1919—	Vol.	5—
Nuovo Ercolani (Milan)	1913—	Vol.	18—
Nuova Veterinaria (Bologna)	1923—	Vol.	1—
<i>Pathologica (Genoa)</i>	1908—	Vol.	1—

ITALY—cont.

<i>Pediatria</i> (Naples)	1913—	Vol. 21—	
		(Ser. 2. Vol. 77—	
<i>Policlinico</i> (Rome) ... Sez. medica	1912—	Vol. 19—	
Sez. pratica	1912—	Vol. 19—	
[<i>Problemi della Nutrizione</i> (Rome)	1924—26	Vols. 1—3]	
<i>Riforma Medica</i> (Naples)	1924—	Vol. 40—	
<i>Rivista Critica di Clinica Medica</i> (Florence)	1913—	Vol. 14—	
<i>Rivista di Malaria</i> (Rome)	1926—	Vol. 5—	
<i>Rivista di Patologia e Clinica della Tuberculosis</i> (Bologna)	1927—	Vol. 1—	
[<i>Rivista Pellagologica Italiana</i> (Florence)	1913—23	Vol. 13—23	
		[Incomplete]	
<i>Sperimentale</i> (Florence)	1913—	Vol. 67—	
<i>Terapia</i> (Milan) Parte pratica	1924—	Vol. 14—	

NORWAY.

<i>Norsk Magasin for Laegevidenskapen</i> (Oslo)	1921—	Vol. 82—	
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POLAND.

<i>Medycyna Dóswiadczalna i społeczna</i> [formerly <i>Przegląd Epidemiologiczny</i>] (Warsaw)	1920—	Vol. 1—	
--	-------	---------	--

PORTUGAL.

<i>Arquivos de Higiene e Patologia Exoticas</i> (Lisbon) [formerly <i>Archivos, &c.</i>]	1905—	Vol. 1—	
<i>Archivos do Instituto Bacteriologico Camara-Pestana</i> (Lisbon)	1906—	Vol. 1—	
<i>Bulletin de la Société Portugaise des Sciences Naturelles</i> (Lisbon)	1907—	Vol. 1—	
[<i>Medicina Contemporanea</i> (Lisbon)	1913—21	Vol. 31—39]	

ROUMANIA.

<i>Archivua Veterinara</i> (Bucarest)	1920—	Vol. 14—	
<i>Bulletins et Mémoires de la Société Médicale des Hôpitaux de Bucarest</i>	1919—	Vol. 1—	

RUSSIA.

<i>Arbeiten aus den Microbiologischen Institut des Volkswirtschaftscommissariats</i> (Moscow)	1925—	Vol. 1—	
<i>Archives Russes de Protistologie</i> (Moscow)	1924—	Vol. 3—	
<i>Archives des Sciences Biologiques</i> (Leningrad)	1923—	Vol. 23—	
* <i>Dnyepetrovskii meditsinskii zhurnal</i> (Dnyepetrovsk)	1926—	Vol. 5—	
* <i>Omsky meditsynsky journal</i> (Omsk)	1926—	Vol. 1—	
<i>Pensée Médicale d'Usbekistane</i> (formerly <i>Journal Médical de l'Asie Centrale</i>) (Taschkent)	1926—	Vol. 5—	
<i>Revue de Microbiologie et d'Epidemiologie</i> (Saratov)	1922—	Vol. 1—	
<i>Russian Journal of Tropical Medicine</i> (Moscow)	1923—	No. 1—	
<i>Travaux de l'Institut de Microbiologie et d'Hygiène d'Azerbaidjan</i> (Baku)	1924—	No. 1—	
<i>Travaux de la Société des Naturalistes de Leningrad. Section de Zoologie et de Physiologie</i> (Leningrad)	1925—	Vol. 55—	

SPAIN.

<i>Archivos del Instituto Nacional de Higiene de Alfonso XIII</i> (Madrid)	1922—	Vol. 1—	
* <i>Boletín demográfico de España</i> (Madrid)	1927	3 trim.	
	1928—	1 trim.	
* <i>Boletín de estadística</i> (Madrid)	1927—	No. 18—	
[<i>Boletín del Instituto Nacional de Higiene Alfonso XIII</i> (Madrid)	1913—19	Vol. 9—15]	
* <i>Boletín técnico de la Dirección general de sanidad</i> (Madrid)	1926—	Vol. 1—	
<i>Medicina de los Países Cálidos</i> (Madrid)	1928—	Vol. 1—	
<i>Revista Española de Medicina y Cirugía</i> (Barcelona)	1918—	Vol. 1—	No. 1
<i>Revista de Higiene y Sanidad Pecuarias</i> (Madrid)	1917—	Vol. 7—	
<i>Revista Medicina de Barcelona</i> (Barcelona)	1924—	Vol. 1—	
<i>Semana Veterinaria</i> (Madrid)	1927—	Vol. 10—	No. 528—
[<i>Siglo Médico</i> (Madrid)	1924—28	Vol. 74—80]	

SWEDEN.

<i>Acta Medica Scandinavica</i> (Stockholm)	1920—	Vol.	54—
<i>Acta Radiologica</i> (Stockholm)	1927—	Vol.	8—
<i>Hygiea</i> (Stockholm)	1920—	Vol.	82—
<i>Skandinavisk Veterinär-Tidskrift</i> (Uppsala & Stockholm)	1911—	Vol.	1—

SWITZERLAND.

<i>Bibliography of Industrial Hygiene</i> (Geneva)	1925—	No. 10—
<i>International Journal of Public Health</i> (Geneva)	1920-21	Vols. 1-2
<i>International Labour Review</i> (Geneva)	1925—	Vol. 12—
<i>Matériaux pour l'Étude des Calamités</i> (Geneva)	1924—	Vol. 1—
<i>Monthly Epidemiological Report of the Health Section of the Secretariat, League of Nations</i> (Geneva)	1924—	No. 64—
<i>Schweizer Archiv für Tierheilkunde</i> (Zurich)	1913—	Vol. 55—
<i>Schweizerische Medizinische Wochenschrift</i> (Basel)	1927—	
<i>Schweizer. Zeitschrift für Gesundheitspflege und Archiv für Sozialfürsorge</i> (Zurich)	1926—	Vol. 6—

TURKEY.

<i>Bulletin Sanitaire de Constantinople</i> [formerly <i>Bulletin de l'Administration Sanitaire des frontières</i>] (Constantinople)	1921-23	Nos. 1-20
--	---------	-----------

AMERICA.

CANADA.

* <i>Bulletin d'Hygiène</i> (Montréal)	1923—	Vol. 10—
<i>Canadian Engineer</i> (Toronto)	1925—	Vol. 49—
<i>Canadian Medical Association Journal</i> (Montreal)	1911—	Vol. 1—
<i>Public Health Journal</i> (Toronto)	1926—	Vol. 17—

CENTRAL AMERICA AND WEST INDIES.

<i>Boletín de la Asociación Médica de Puerto Rico</i> (San Juan)	1914—	Vol. 10—
<i>Bulletin de la Société de Médecine d'Haïti</i> (Port-au-Prince)	1926—	Vol. 1—
<i>Jamaica Public Health Bulletin</i>	1917—	
* <i>Journal of the Port-of-Spain Medical Society</i>	1924—	Vol. 1—
[<i>Monthly Reports of the Department of Health of the Panama Canal</i> (Washington)	1907-1919]	
<i>Porto Rico Review of Public Health and Tropical Medicine</i> (San Juan)	1927—	Vol. 3— No. 1—
<i>Proceedings of the Medical Association of the Isthmian Canal Zone</i> [formerly <i>Proceedings of the Canal Zone Medical Association</i>] (Mount Hope, C.Z.)	1908—	Vol. 1—
* <i>Tropical Agriculture</i> (Trinidad)	1924—	Vol. 1—

SOUTH AMERICA.

ARGENTINE REPUBLIC.

[<i>Anales del Departamento Nacional de Higiene</i> (Buenos Aires)	1919-22	Vol. 25-28]
<i>Anales del Instituto Modelo de Clínica Médica</i> (Buenos Aires)	1917—	Vol. 2—
<i>Boletín del Instituto de Clínica Quirúrgica</i> (Buenos Aires)	1925—	Vol. 1—
<i>Prensa Médica Argentina</i> (Buenos Aires)	1926—	Vol. 13—
[<i>Revista del Instituto Bacteriológico</i> (Buenos Aires)	1918-19	Vols. 1-2
		[Incomplete]
<i>Revista de Medicina Veterinaria</i> (Buenos Aires)	1925—	Vol. 8—
<i>Revista Zootécnica</i> (Buenos Aires)	1920—	Vol. 7— No. 84—
<i>Semana Médica</i> (Buenos Aires)	1925—	Vol. 32—

BRAZIL.

[<i>Amazonas Médico</i> (Manaos)	1918-22	Vols. 1-4]
* <i>Annaes da Faculdade de Medicina de São Paulo</i>	1926—	Vol. 1—
<i>Annaes Paulistas de Medicina e Cirurgia</i> (São Paulo)	1915—	Vol. 4— No. 3—
* <i>Archivos de Botânica do Estado de São Paulo</i>	1925—	Vol. 1—
<i>Archivos Brasileiros de Medicina</i> (Rio de Janeiro)	1911—	Vol. 1—

BRAZIL—cont.

[Archivos da Escola Superior de Agricultura e Medicina Veterinaria (Pinheiro, E. do Rio) ...	1917-18	Vol.	1-2	
<i>Archivos de Hygiene (Rio de Janeiro)</i> ...	1927—	Vol.	1—	
Boletim Biologico (São Paulo) ...	1926-27			No. 1—
*Boletim hebdomadario de estatistica demographo-sanitaria da Cidade do Rio de Janeiro ...	1928—	Vol.	26—	
<i>Boletim do Instituto Brasileiro de Sciencias (Rio de Janeiro)</i> ...	1925—	Vol.	1—	
Boletim da Sociedade Brasileira de Medicina Veterinaria (Rio de Janeiro) ...	1925—	Vol.	2—	
Boletim de la Sociedade de Medicina e Cirurgia de S. Paulo (Brazil) ...	1919—	Vol.	2—(ser. 2)	No. 2—
Brazil Medico (Rio de Janeiro) ...	1909—	Vol.	23—	
A Folha Medica (Rio de Janeiro) ...	1927—	Vol.	8—	No. 22—
<i>Memorias do Instituto de Butantan (S. Paulo)</i> ...	1919—	Vol.	1—	
<i>Memorias do Instituto Oswaldo Cruz (Rio de Janeiro-Manguinhos)</i> ...	1909—	Vol.	1—	
<i>Revista de Biologia e Hygiene (Sao Paulo)</i> ...	1927—	Vol.	1—	
Revista Medico-Cirurgica do Brazil (Rio de Janeiro)	1921—	Vol.	29—	
Revista de Veterinaria e Zootecnia (Rio de Janeiro)	1917—	Vol.	7—	
<i>Sciencia Medica. Revista Brasileira de Medicina e Sciencias Affins (Rio de Janeiro)</i> ...	1923—	Vol.	1—	
<i>Servico Sanitario do Estado de São Paulo Trabalhos publicados</i> ...	1918—	N.S.	No. 1—	

BRITISH GUIANA.

British Guiana Medical Annual ..	1890-92, 1894-1902, 1906—
----------------------------------	---------------------------

CHILE.

* <i>Boletín sanitario (Santiago)</i> ...	1927—	Vol.	1—
---	-------	------	----

COLOMBIA.

Repertorio de Medicina y Cirugía (Bogotá)...	1914—	Vol.	6—
<i>Revista Chnica (Medellin)</i> ...	1916—	Vol.	1—
* <i>Revista de medicina tropical (Bogotá)</i> ...	1928—	Vol.	1—

PERU.

<i>Anales de la Facultad de Medicina (Lima)</i> ...	1918—	Vol.	1—
<i>Cronica Médica (Lima)</i> ...	1913—	Vol.	30—
* <i>Prensa médica (Arequipa)</i> ...	1927—	Vol.	1—

VENEZUELA.

[<i>Anales de la Direccion de la Sanidad Nacional (Caracas)</i> ...	1919-23	Vols.	1-4]
Gaceta Medica de Caracas (Caracas)...	1914—	Vol.	21—
[Gaceta Medica de Ciudad-Bolivar (Ciudad-Bolivar)	1920-21	No. 67-80]	

UNITED STATES.

American Journal of Diseases of Children (Chicago)...	1926—	Vol.	31—	
<i>American Journal of Hygiene (Baltimore)</i> ...	1921—	Vol.	1—	
American Journal of Medical Sciences (Philadelphia)	1927—	Vol.	173—	
<i>American Journal of Pathology (Boston)</i> [formerly Journal of Medical Research] ...	1925—	Vol.	1—	
American Journal of Physiology (Baltimore) ...	1927—	Vol.	80—	
American Journal of Public Health (New York) ...	1913-16	Vols.	3-6	
	1924—	Vol.	14—	
American Journal of Syphilis (St. Louis) ...	1925—	Vol.	9—	No. 4—
<i>American Journal of Tropical Diseases and Preventive Medicine (New Orleans)</i> ...	1913-16	Vols.	1-3	
<i>American Journal of Tropical Medicine (Baltimore)</i> ...	1921—	Vol.	1—	
American Physical Education Review (Springfield, Mass.) ...	1927—	Vol.	32—	
<i>American Review of Tuberculosis (New York)</i> ...	1926—	Vol.	12—	
<i>American Society of Tropical Medicine—Transactions (New Orleans)</i> ...	1904-14	Vols.	1-9	
<i>Annals of Medical History (New York)</i> ...	1927—	Vol.	11—	

UNITED STATES—*cont.*

Archives of Dermatology & Syphilology [formerly Journal of Cutaneous Disease including Syphilis] (Chicago)	1913—	Vol.	31—
Archives of Internal Medicine (Chicago)	1908—	Vol.	1—
* Biological Abstracts (Menasha, Wis.)	1926—	Vol.	1—
* Boletín de la Oficina sanitaria pan-americana (Washington)	1922—	Vol.	1—
Boston Medical & Surgical Journal (Boston)	1915—27	Vol.	172—197
[Bulletin of the Antivenin Institute of America (Philadelphia)	1927—28	Vol.	1—2]
* Bulletin of the New York Academy of Medicine, 2nd Series	1925—	Vol.	1—
Bureau of Animal Industry Bulletins (Washington)	1909—	[Incomplete]	
Bureau of Education Bulletins (Washington)	1926—		
California and Western Medicine (San Francisco)	1926—	Vol.	25— No. 2—
* Clifton Medical Bulletin (Clifton Springs, N.Y.)	1922—	Vol.	8—
[Collected Reprints from the George Williams Hooper Foundation for Medical Research (Univ. of California)	1915—20	Vols.	1—4]
[Collected Studies from the Research Laboratory, Department of Health, City of New York	1906—19	Vols.	1—9]
Cornell Veterinarian (Ithaca, N.Y.)	1917—	Vol.	7—
Engineering News Record (New York)	1925—	Vol.	95 No. 15—
Experiment Station Record (Washington)	1921—	Vol.	44—
Health News (Albany, N.Y.)	1924—	Vol.	1—
Hospital Social Service (New York)	1926—	Vol.	13—
Hygeia (Chicago)	1924—	Vol.	2—
Hygienic Laboratory Bulletins (Washington)	1903—	[Incomplete]	
Illinois Biological Monographs (Urbana)	1915—	Vol.	1—
[Index Medicus (Washington)	1912—20	[2 ser.] Vol. 10—18]	
Industrial Hygiene Bulletin (New York)	1926—	Vol.	3—
Journal of Agricultural Research (Washington)	1920—	Vol.	20—
Journal of the American Medical Association (Chicago)	1910—	Vol.	54—
* Journal of the American Statistical Association (New York)	1928—	Vol.	23—
* Journal of the American Veterinary Medical Association (Detroit)	1915—16	Vols.	48—49
	1917—23	Vols.	51—62]
	1924—	Vol.	65—
Journal of the American Water Works Association (Baltimore)	1925—	Vol.	14—
* Journal of Applied Psychology (Worcester, Mass.)	1928—	Vol.	12—
* Journal of Bacteriology (Baltimore)	1916—21	Vols.	1—6
	1927—	Vol.	13—
Journal of Biological Chemistry (Baltimore)	1927—	Vol.	72—
Journal of Economic Entomology (Geneva, N. Y.)	1908—	Vol.	1—
Journal of Experimental Medicine (New York)	1896—	Vol.	1—
Journal of Immunology (Baltimore)	1925—	Vol.	10—
Journal of Industrial Hygiene & Abstract of Literature (Baltimore)	1922—	Vol.	3—
Journal of Infectious Diseases (Chicago)	1904—	Vol.	1—
Journal of Laboratory & Clinical Medicine (St. Louis)	1916—	Vol.	2—
Journal of Medical Research (Boston) [now American Journal of Pathology]	1901—24	Vols.	6—44
Journal of Parasitology (Urbana)	1914—	Vol.	1—
Journal of Pharmacology & Experimental Thera- peutics (Baltimore)	1925—	Vol.	25—
Journal of Preventive Medicine (Baltimore)	1926—	Vol.	1—
[Journal of Sociologic Medicine (Easton)	1916—18	Vol.	17—19]
Long Island Medical Journal (Brooklyn)	1919—	Vol.	13—
[Medical Record (New York)	1914—22	Vols.	86—101]
Mental Hygiene (Albany)	1926—	Vol.	10—
Mental Hygiene Bulletin (New York)	1926—	Vol.	4— No. 8—
Metropolitan Life Insurance Co. Statistical Bulle- tin (New York)	1927—	Vol.	7—
Military Surgeon (Washington)	1913—	Vol.	33—

UNITED STATES—*cont.*

Monographs of the Rockefeller Institute for Medical Research (New York)	1920—	No.	13—
* <i>Monthly Vital Statistics Review N. Y. State Dept. of Health (Albany)</i>	1920—	Vol.	1—
New England Journal of Medicine (formerly Boston Medical & Surgical Journal) (Boston)	1928—	Vol.	198—
New Orleans Medical & Surgical Journal (New Orleans)	1912—	Vol.	65—
[New York Medical Journal (New York)	1910-20	Vols.	91-112]
*North American Veterinarian (Evanston, Ill.)	1928—	Vol.	9—
*Physiological Reviews (Baltimore)	1923—	Vol.	3—
Proceedings of the New Jersey Mosquito Extermination Association	1914—		
<i>Proceedings of the Society for Experimental Biology and Medicine (New York)</i>	1903—	Vol.	1—
Proceedings of the United States National Museum (Washington)	1879—	Vol.	2—
Public Health Bulletins (Washington)	1908—		[Incomplete]
Public Health Engineering Abstracts (Washington)	1924—		[Incomplete]
Public Health Reports (Washington)	1909—	Vol.	24—
* <i>Quarterly Cumulative Index Medicus (Chicago)</i>	1927—	Vol.	1—
<i>School of Hygiene & Public Health: Johns Hopkins University: Collected Papers (Baltimore)</i>	1920—	Vol.	1—
School Lute (Washington)	1927—	Vol.	13—
[<i>Social Pathology</i> (Washington)	1924—	Nos.	1-9]
Southern Medical Journal (Birmingham, Alabama)	(1911, 1912 incomplete)		
	1913—	Vol.	6—
<i>Southwestern Medicine (Phoenix, Arizona)</i>	1917—	Vol.	1—
Studies from the Rockefeller Institute for Medical Research Reprints (New York)	1913—	Vol.	17—
[Texas State Journal of Medicine (Fort Worth)	1905-22	Vols.	1-18]
			[Incomplete]
United States Naval Medical Bulletin (Washington)	1909—	Vol.	3—
<i>United States Veterans' Bureau Medical Bulletin (Washington)</i>	1925—	Vol.	1—
<i>United States War Department Bulletin (Washington)</i>	1913—	No.	1—
University of California (Berkeley):			
Publications in Entomology	1906—	Vol.	1—
Publications in Pathology	1903—	Vol.	1—
Publications in Public Health	1928—	Vol.	1—
Publications in Zoology	1908—	Vol.	6—
University of Kansas:			
<i>Science Bulletin (Lawrence)</i>	1902—	Vol.	1—
Venereal Disease Information (Washington)	1923—	Vol.	4—
Veterinary Medicine (Chicago)	1913—	Vol.	8—
<i>Zoopathologica (New York)</i>	1928—	Vol.	1—

ASIA.

CHINA.

[<i>Bulletin Médical Franco-Chinois (Peking)</i>	1920	Vol.	1
*Caduceus (Hongkong)	1928—	Vol.	7—
China Medical Journal (Shanghai)	1912—	Vol.	26—
<i>Contributions from the Peking Union Medical College (Peking)</i>	1921—	Vol.	1—
* <i>National Epidemic Prevention Bureau, Peking, China. Monthly Returns</i>	1925—	Vol.	1—
National Medical Journal of China (Shanghai)	1919—	Vol.	5—

EAST INDIAN ARCHIPELAGO.

Geneeskundig Tijdschrift voor Nederlandsch-Indië (Weltevreden)	1901—	Vol.	41—
			[Incomplete]
Journal of the Philippine Islands Medical Association (Manila)	1921—	Vol.	1—
Mededeelingen uit het Geneeskundig Laboratorium te Weltevreden (Batavia)	1919—	3 Ser. A.	No. 1

EAST INDIAN ARCHIPELAGO—*cont.*

<i>Mededeelingen van het Pathologisch Laboratorium te Medan-Sumatra (Medan)</i>	1927—	No. 1—
<i>Mededeelingen van den Dienst der Volksgezondheid in Nederlandsch-Indië</i> [formerly " <i>van den Burgerlijken Geneeskundigen Dienst</i> "] (Batavia) ...	1912—	Vol. 1—
* <i>Monthly Bulletin of the Philippine Health Service (Manila)</i>	1921—	Vol. 1
<i>Nederlandsch-Indische Bladen voor Diergeneeskunde (Buitenzorg)</i>	1919—	Vol. 31—
<i>Philippine Agricultural Review (Manila)</i>	1916—	Vol. 9—
<i>Philippine Journal of Science</i> [formerly <i>Philippine Journal of Science. Section B. Philippine Journal of Tropical Medicine</i>] (Manila) ...	1906—	Vol. 1—
* <i>Sanidad y beneficencia (Havana)</i>	1909	Vol. 1
	1910—	Vol. 3—
* <i>Vida nueva (Havana)</i>	1927—	Vol. 19—

INDIA AND CEYLON.

<i>Agricultural Research Institute, Pusa, Bulletins. (Calcutta)</i>	1912—	[Incomplete]
<i>Arquivos da Escola Médico-Cirurgica de Nova Goa. Ser. A. (Nova Goa)</i>	1927—	No. 1—
<i>Arquivos Indo-Portugueses de Medicina e Historia Natural (Nova Goa)</i>	1921	Vol. 1—
<i>Boletim Geral de Medicina e Farmacia (Nova Goa)</i> ...	1919—	5 Ser. No. 1—
<i>Ceylon Journal of Science, Sect. D., Med. Sci. (Colombo)</i>	1924—	Vol. 1—
<i>Indian & Eastern Engineer (Calcutta)</i>	1915-21	Vols. 36-49]
[<i>Indian Engineering (Calcutta)</i>	1915-24	Vols. 57-75 No. 6]
<i>Indian Journal of Medical Research (Calcutta)</i> ...	1913—	Vol. 1—
<i>Indian Medical Gazette (Calcutta)</i>	1889-1908	[Vols. 24 & 34-43
	1909—	Vol. 44— Incomplete
	1910	Vol. 30
	1915-18	Vols. 35-37
	1919—	Vol. 39—
<i>Indian Medical Research Memoirs (Calcutta)</i> ...	1924—	No. 1—
<i>Indian Veterinary Journal (Madras)</i>	1928—	Vol. 4—
<i>Journal of the Association of Medical Women in India (Delhi)</i>	1923—	Vol. 11—
<i>Journal of Tropical Veterinary Science (Calcutta)</i> ...	1906-12	Vols. 1-7
<i>Memoirs of the Department of Agriculture in India (Calcutta)</i> :		
<i>Bacteriological Series</i>	1912—	Vol. 1—
<i>Veterinary Series</i>	1913—	Vol. 1—
<i>Paludism (Simla)</i>	1910-12	Nos. 1-5
<i>Report of the Agricultural Research Institute and College, Pusa. (Calcutta)</i>	1907—	[Incomplete]
<i>Scientific Memoirs by Officers of the Medical & Sanitary Department of the Government of India (Calcutta)</i>	1902-12	(New Ser.) Nos. 1-60

INDO-CHINA, AND FURTHER INDIA.

<i>Annual Reports of the Institute for Medical Research, Kuala Lumpur, Federated Malay States. (Kuala Lumpur)</i>	1912—	
<i>Archives des Instituts Pasteur d'Indochine (Saigon)</i> ...	1925—	Vol. 1—
<i>Bulletins from the Institute for Medical Research, Federated Malay States</i>	1924—	No. 1—
[<i>Bulletin de la Société Médico-Chirurgicale de l'Indochine (Hanoi & Haiphong)</i>	1910-22	Vol. 1-12
		[Incomplete
<i>Medical Journal of the Siamese Red Cross</i>	1918-20	Vol. 1-3]
<i>Monthly Bulletin of the Eastern Bureau, League of Nations Health Organisation (Singapore)</i> ...	1925—	Vol. 1—
<i>Malayan Medical Journal (Penang)</i>	1926—	Vol. 1—
<i>Studies from Institute for Medical Research, Federated Malay States (Singapore)</i>	1901—	Vol. 1—[Incomplete]

INDIO-CHINA AND FURTHER INDIA—cont.

- Transactions of the Malaya Branch of the British Medical Association (Singapore) ... 1923— No. 9—
Weekly Fasciculus. Epidemiological Intelligence received by the Eastern Bureau, League of Nations Health Organisation (Singapore) ... 1925— Vol. 1—

JAPAN.

- Acta Medicinalia in Keijo* [formerly *Mitteilungen aus der medizinischen Akademie zu Keijo*] ... 1928— Vol. 11—
Acta Scholae Medicinalis Universitatis Imperialis in Kioto (Kioto) ... 1916— Vol. 1—
Aichi Journal of Experimental Medicine (Nagoya) ... 1923— Vol. 1— No. 1—
Fukuoka-Ikwadaigaku-Zasshi (Fukuoka) ... 1927— Vol. 20— No. 1—
Japanese Journal of Medical Sciences. Abstracts (Tokyo) ... 1922— Vol. 1—
Japan Medical World (Tokyo) ... 1921— Vol. 1—
Japanese Journal of Dermatology and Urology [formerly *Japanische Zeitschrift für Dermatologie u. Urologie*] (Tokyo) ... 1917— Vol. 17— No. 7—
Shikwa Zasshi ... 1917-22] ...
Journal of the Chosen Medical Association (Chosen) ... 1927— No. 72—
Journal of the College of Agriculture, Imperial University of Tokyo (Tokio) ... 1916— Vol. 3—
Journal of the Japanese Society of Veterinary Science (Tokyo) ... 1922— Vol. 1—
Journal of Oriental Medicine (Dairen) ... 1923— Vol. 1— No. 2—
Journal of the Public Health Association of Japan (Tokio) ... 1926— Vol. 2—
Kitasato Archives of Experimental Medicine (Tokyo) ... 1917— Vol. 1—
[Kyoto Igaku Zasshi (Kyoto)] ... 1917-21 Vols. 14-18]
**Mitteilungen aus der medizinischen Akademie zu Keijo* [now *Acta Medicinalia in Keijo*] ... 1917-24 Vol. 1-7
Mitteilungen aus der medizinischen Fakultät der Kaiserlichen Kyushu-Universität (Fukuoka) ... 1917— Vol. 3—
Mitteilungen aus der medizinischen Fakultät der Kaiserlichen Universität zu Tokyo (Tokio) ... 1911— Vol. 10—
Mitteilungen ueber allgemeine Pathologie und pathologische Anatomie [formerly *Mitteilungen aus dem pathologischen Institut der Kaiserlichen Universität zu Sendai, Japan*] ... 1919— Vol. 1—
[Mitteilungen der Medizinischen Gesellschaft zu Tokio (Tokio)] ... 1917-20 Vols. 31-34]
Nagoya Journal of Medical Science (formerly Aichi Journal of Experimental Medicine) (Nagoya) ... 1928— Vol. 2— No. 1—
Okayama-Igakka-Zasshi (Okayama) ... 1925— No. 423—
Oriental Journal of Diseases of Infants (Kyoto) ... 1926— Vol. 1—
Saikingaku Zasshi ... 1917-23
Sei-i-Kwai Medical Journal (Tokio) ... 1913— Vol. 32—
Taiwan Igakkai Zasshi (Formosa) ... 1917—
Tokyoer Medizinische Wochenschrift (Tokyo) ... 1917— No. 2046—
[Verhandlungen der Japanischen Pathologischen Gesellschaft (Tokyo)] ... 1911— Vol. 1—

AFRICA.

- Archives des Instituts Pasteur de l'Afrique du Nord (Algiers & Tunis)* ... 1921-22 Vols. 1-2
Archives de l'Institut Pasteur d'Algérie (Algiers) ... 1923— Vol. 1—
Archives de l'Institut Pasteur de Tunis (Tunis) ... 1906— Vol. 1—
Archivo Italiano di Science Mediche Coloniali (Tripoli) ... 1920— Vol. 1—
**Bulletin du Comité d'études historiques et scientifiques de l'Afrique occidentale française (Gorée)* ... 1924— Vol. 7—
Bulletin Médical du Katanga (Elisabethville) ... 1924— No. 1—
Bulletin de la Société Médico-Chirurgicale française de l'Ouest-Africain (Dakar) ... 1919-21 Vols. 1-8

AFRICA—cont.

Bulletin de la Société Ophthalmologie d'Egypte ...	1912—		
[Journal of the Department of Agriculture, Union of South Africa (Pretoria) ...	1921-26 Vols.	1-12]	
Journal of the Medical Association of South Africa (British Medical Association) (Cape Town) ...	1927—	Vol.	1—
Kenya and East African Medical Journal (formerly Kenya Medical Journal) (Nairobi) ...	1924—	Vol.	1—
Magallah Tibbiah El Masriah (Cairo) ...	1923—		
[Medical Journal of South Africa [formerly Transvaal Medical Journal] (Johannesburg) ...	1912-26 Vols.	8-22]	
[Nyasaland Sleeping Sickness Diary (Zomba) ...	1908-15 Nos.	1-25]	
Proceedings of the Transvaal Mine Medical Officers' Association (Johannesburg) ...	1921—	Vol.	1—
*Publications of the South African Institute for Medical Research (Johannesburg) ...	1913—	Vol.	1—
Revista Médica de Angola (Loanda) ...	1921—	Vol.	1—
Rhodesia Agricultural Journal (Salisbury) ...	1915—	Vol.	12—
[South African Medical Record (Cape Town) ...	1910—	Vol.	8—]
West African Medical Journal (Lagos) ...	1927—	Vol.	1—

AUSTRALASIA.

AUSTRALIA.

Australian Institute of Tropical Medicine Collected Papers (Townsville) ...	1914—	No.	1—
*Australian Journal of Experimental Biology and Medical Sciences (Adelaide) ...	1924—	Vol.	1—
Commonwealth of Australia: Quarantine Service Publications (Melbourne) ...	920-23	Nos.	1-19
Commonwealth of Australia: Department of Health. Service Publications (Melbourne) ...	1922—	No.	20—
Industrial Hygiene ...	1924—	No.	1—
Tropical Division ...	1923—	No.	1—
Veterinary Hygiene ...	1924—	No.	1—
Health (Melbourne) ...	1923—	Vol.	1—
[Health Forum (Sydney) ...	1923—	Vol.	1— Nos 1-4]
Journal of the Australian Veterinary Association (Sydney) ...	1925—	Vol.	1—
Medical Journal of Australia (Sydney) ...	1914—	Vol.	1—
Queensland Agricultural Journal ...	1919—	Vol.	12—
Records of the South Australian Museum ...	1918—	Vol.	1—

NEW ZEALAND.

New Zealand Medical Journal (Wellington) ...	1913—	Vol.	12—	No. 45—
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